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Steel Buyers Close For Future

Filling Up of Mills and Continued Appearance of Heavy New Demands Influence More Extended Covering—Japan To Place Great Construction Tonnage—Large Car Orders Distributed—Foreign Sales Keep Up Along Atlantic Coast

COVERING of steel requirements for the second quarter is beginning to come forward with good prospects both as to volume and price stability. The leading maker has opened its books for second quarter on sheets and tin plate at unchanged prices and independent mills are preparing to do likewise. An increasing inquiry and some buying beyond April 1 is appearing in steel bars, structural shapes and other lines. Large demands for semifinished material for second quarter are before sellers.

Reports of some shrinkage in new tonnage apparently are not trustworthy as all evidence is to the contrary. Bookings at Pittsburgh in tonnage products are being received at the best rate since April. At Chicago leading mills are 25 per cent ahead of January in new business. Eastern mills helped by the filling up of western producers, make the best showing in incoming orders in months.

Operations again have been raised several paces and for the whole industry now are at 86 per cent of ingot capacity. The Steel corporation this week is running at above 94 per cent, the best record yet and the independents about 82 per cent.

Japan's Need Heavy

What the Japanese reconstruction loan will bring to American mills in the way of steel business, is not yet made clear. That it will be a heavy tonnage is certain and in some quarters the amount has been estimated as high as 1,000,000 tons which would be spread out over a period of time. The form of construction that finally will be settled upon, will have some bearing on the tonnage.

The Ford Motor Co. has inquired for 250,000 tons of lake iron ore for next season. Ore operators have not yet considered next year's prices.

The dock strike now in progress with the prospect of coal troubles later, the miners having voted to abrogate their agreement, leaves uncertain the contribution of British mills to present Japanese needs or to the export market in general. The first day of the strike over 50,000 tons of export steel business was lost by British producers, it is estimated. As a result of the situation, Japan is diverting galvanized sheet business to this country. Operations in the Ruhr have been raised to 33 blast furnaces and 74 open hearths.

Many Cars Closing

Recent expectations of the placing of major orders for equipment by leading railroad systems have come to a more definite stage this week. Of the large New York Central budget, 8000 cars have been allocated to two builders. The Pennsylvania has advanced its negotiations to the point where it has specified 8000 box, 3000 automobile and 1000 stock cars and is about to distribute these. The Norfolk & Western closed for 2000 hoppers additional making a total of 6000 and of the steel required the Carnegie Steel Co. will supply 50,000 tons and Bethlehem Steel Co. 20,000 tons. The Louisville & Nashville wants 4000 cars and the Southern 2500.

Structural business keeps active. January awards while less than December in total were large, amounting to 187,200 tons or 72 per cent of capacity. Shipments were 163,800 tons. Awards this week include 7000 tons for a building at Philadelphia and 6500 tons for Louisville & Nashville bridgework.

A purchase of 25,000 tons of foundry grades for second quarter delivery by the American Radiator Co. for various plants outside of Buffalo is the principal pig iron transaction of the week. The market is quieter and more stationary.

IRON TRADE REVIEW composite of fourteen leading iron and steel products is unchanged for the first time in many weeks at $43.53.

East Buying Abroad

Further sales of French and Belgian steel have been made to buyers at New York, Boston and other eastern ports. At New York and Philadelphia 8000 to 10,000 tons of bars and shapes was bought in the week around 2.00c per pound, delivered, duty paid. The full price range is from 1.90c to 2.10c. A Portland, Me., buyer took French billets at $33. On an inquiry for 5000 tons of billets from San Francisco, $25.74. Antwerp was named.

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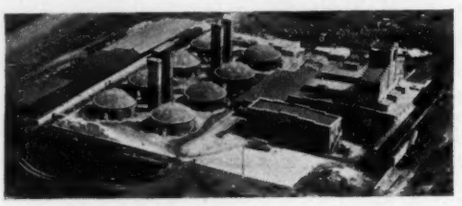
Classification Enhances Readability

IF YOU read Iron Trade Review closely, you will notice that its editorial contents readily are divided into sections. The first, or market section, comprises the general market review, the domestic iron, steel and nonferrous markets by products, the foreign and miscellaneous markets by localities, editorials and the "business trend" charts on yellow paper. The second, or engineering section, follows the yellow chart section and includes general and technical articles on problems of the metalworking industry. The last, or general news section, contains a wealth of miscellaneous items, classified as personals, obituaries, "Here and There" items, announcements of business changes, plans of new and expanding companies, and machinery market reports. Once you have grasped this arrangement you will have little difficulty in turning to any regular department.



Makers and Users are Co-operating to Improve Refractories. Read the Article on Page 546

Do You Know That—

In addition to the 20,022 major executives, as classified in this column last week, the following operating executives are readers of IRON TRADE REVIEW: Works managers, 1992; superintendents, 2778; engineers, 2291; and foremen, 1348.

Pig Iron Is Moderately Active

Radiator Company's Purchase of 25,000 Tons of Foundry Grade Leading Transaction of Week—Basic Is Closed at $22, Valley, and Foundry Sales Continue at $23 to $23.50—Shipments Large

PITTSBURGH, Feb. 19.—The pig iron market still drags. Buyers continue able to close up on the basis of last sales, despite the effort of several shippers to hold the market at $1 advance. The Edgewater Steel Co. has closed a portion of its 7500-ton basic requirement for second quarter at $22, valley. Some producers are quoting $23, valley, minimum. The Allen S. Davison Co. is proceeding no further with its 6000-ton inquiry, out three weeks. No other basic negotiations are under way. Bessemer iron is exceedingly quiet. The Valley Mould & Iron Corp. bought 250 tons of bessemer at $23, Johnstown, Pa. Some producers are holding to $24, valley, minimum. The last valley bessemer sold brought $23.50, valley. Spasmodic buying of foundry iron continues in single carloads to several hundred tons at a time. The Westinghouse Electric & Mfg. Co,, however, has bought a tonnage for Cleveland and also for Trafford City, Pa. The latter purchase included 600 tons of Nos. 1, 2 and 3 irons for Trafford City, on a basis of $23, Johnstown, for the No. 2 grade, regular differentials applying. Sales of foundry iron also are noted at $23 and $23.50. Three producers are quoting $24, valley, for second quarter. There are no new bookings on that basis. Low phosphorus copper-free activity was less marked in the past week than in the preceding one. Several large users then closed until July 1 for 1000 tons or more at $29, valley. Some smaller users have yet to be heard from. Others will buy on a monthly basis as needed.

Prices Are Firmer

Boston, Feb. 19.—Pig iron prices in New England are firmer despite the presence of a few soft spots. Several of the leading eastern Pennsylvania furnaces have booked heavy tonnages in districts outside of New England and are more independent, some of them having advanced their prices. A $23 base price, eastern Pennsylvania, is close to rock bottom at present, although a round tonnage probably would develop a price 50 cents below this. In the Buffalo district the resale tonnage has practically disappeared and second quarter iron is held firmly at $22, equivalent to $26.91, delivered. New England sales show fair improvement for the past week. A northern New England manufacturer took 500 tons of eastern Pennsylvania iron at $22.50, furnace, or $26.15 delivered. A Massachusetts manufacturer took 1000 tons in two lots of 500 tons each. Other sales of 300 and 400 tons were made. Several lots of foreign iron were included in the week's transactions. Some of these involved iron from India. Belgian iron has been quoted at $23 c.i.f. Boston. The H. B. Smith Co. is in the market for 7000 to 8000 tons. Other inquiry, although for small individual lots, is widespread.

Prices Show Higher Tendency

New York, Feb. 19.—Pig iron buying during the past week aggregated about 20,000 tons in this territory. Inquiries are somewhat light but generally the needs of consumers indicate that further buying is to be done. One of the important developments is the disappearance of some of the low prices recently quoted on foreign iron. Not only are prices showing a higher tendency abroad, but ocean freights have advanced. It is believed foreign foundry iron containing higher than 0.15 per cent phosphorus could not be had at much less than $22 c.i.f. tidewater, or $22.75, duty paid. Prices on domestic iron show a firmer tendency. Some of the business booked by eastern furnaces the past week went at $22.50, base furnace, but anything under $23 now would be exceptional. Stocks at furnaces, and the rate of production are heavy. Central Pennsylvania foundry iron may be quoted at $22 to $23, base. The market on Buffalo iron is around $22, base furnace. Small tonnages of Alabama foundry iron have been sold in this territory at $23, base furnace.

Buffalo Market Firmer

Buffalo, Feb. 19.—A little more firmness is apparent in the pig iron market, one producer having established a minimum price of $23 base with $23.50 for 2.25 to 2.75 silicon and $24 for 2.75 to 3.25 silicon for second quarter. Another producer has for some time been on a similar basis for first quarter iron, but has been asking only $22 for second quarter delivery. One interst still is on a $22 base for first and second quarter delivery. Differentials are being sought and obtained in most instances. Inquiry totals approximately 20,000 tons including individual inquiries for 5000, 3000 and 1100 tons of foundry. Two producers find themselves practically sold up for first quarter. Sales recorded by one interest are 8000 to 9000 tons, and by another about 4000 tons. Lackawanna has withdrawn temporarily from the market.

The American Radiator Co., has closed for 25,000 tons of foundry iron for various plants outside of Buffalo for the second quarter.

Substantial Business Closed

Cleveland, Feb. 19.—Moderate size tonnages of pig iron for second quarter delivery continue to be placed with furnace interests represented in the northern Ohio group, and the market is steady. The largest transaction in the past week was the purchase by the American Radiator Co., of 25,000 tons for various plants, some of which was figured on by furnaces with headquarters here. The order was divided among several producers. Aside from this, a substantial volume of business was done, orders placed during the week with one company amounting to 10,000 tons, and with another around 5000 tons, in lots up to 2000 tons. Inquiry is being closed promptly. Some foundries are asking for delivery in February of iron due them in March, and in general the melt is increasing. Considerable resale iron has been offered in the past week, which has had a tendency to affect valley prices. The valley market is quotable at $23.50 to $24, and the same range applies to the Ironton district. Buffalo iron is reported to have been sold in southern Ohio, and a price at least as low as $22, furnace, was done in competition with southern Ohio furnaces. Lake furnaces are selling iron at $24, but the Cleveland market is not active. The Westinghouse Electric & Mfg. Co. has not closed on its inquiry for 2900 tons for its Cleveland plant, local makers say. The American Steel Foundries is reported to have placed 2000 tons of basic for which it was inquiring last week, outside this district. Only one local maker was in position to bid on the order. This interest considers the valley basic price at $23.

Sales of charcoal iron aggregating 2700 tons for second quarter delivery to rollmakers in Pittsburgh and Canton territories are noted.

Good Sales At Chicago

Chicago, Feb. 19.—Aggregate sales of northern foundry and malleable iron are good despite an absence of outstanding inquiries. Fundamental conditions in the Chicago iron market apparently are sound, many melters anticipating contract obligations. Most makers of railway equipment either have bought sparingly, or not at all, and with much railroad business coming out this source is likely to provide good business. Shipments apparently are slightly exceeding production. A good tonnage for the second quarter has been sold, and producers' position for the second quarter is much better than at the corresponding period a year ago. Northern iron is holding firm at $24.50, furnace. A large malleable castings company is understood to have placed a round tonnage of malleable and basic for Chicago, Indianapolis, and St. Louis plants. A Wisconsin melter placed 800 tons of foundry iron for second quarter. Southern iron quotations range from $23 to $23.50, Birmingham, but sales are limited to a few hundred tons. Charcoal iron still is $26, furnace. There is no talk of an advance in price.

It develops, as a result of charges of violation of the antidumping section of the tariff act, that an embargo was placed recently on iron from the Algoma Steel Co. but it was raised two days later on protest from Canadian producers. It is reported that efforts are under way to ask the tariff commission to increase the present 75-cent duty by 50 per cent.

Sellers Are Satisfied

Cincinnati, Feb. 19.—Sales of pig iron and inquiries are not up to recent high

levels, but producers and sellers find no cause for complaint. Some melters have purchased conservatively for second quarter and large needs may be covered in the next few weeks. One furnace interest in the southern Ohio district announces that more than a month's output has been sold for second quarter. Southern foundry iron is $23, Birmingham, although $22.50 can be done with at least one furnace interest on tonnage. While $24, Ironton, represents the prevailing quotation on northern iron, reports are current that $23.50 has been done without difficulty. The most important sale in this territory involved 350 tons of southern iron for material. Selling agencies have received numerous requests to expedite shipments and anticipate contract quotas. The largest sale was by the St. Louis Coke & Iron Co. and involved 4000 tons of basic for second quarter to an East Side melter. The same producer made small scattering sales aggregating about 400 tons. The representative of a Birmingham furnace reported the sale of 300 tons to a local jobbing foundry and 150 to a stove builder. A Quincy melter purchased 100 tons and 200 tons were sold to an Indiana melter.

An inquiry is pending for 10,000 to 12,000 tons of foundry iron for freight rates and the advancing tendency abroad make it difficult to do under $22.75, duty paid tidewater, even on foundry iron with phosphorus over 1.5 per cent. The eastern market now is quite firm at $23, base furnace, with anything under that price exceptional. Virginia foundry is firmer and the $25 price practically has disappeared, most business going at $26, base furnace. Five hundred to 1000 tons of copper bearing, low phosphorus iron was sold this past week both over and under $27, furnace, depending upon foreign competition. English copper free, low phosphorus is obtainable at $27.50, duty paid tidewater or less, although for

Prices Present and Past

Representative market figures yesterday, and for last month, three months ago and one year ago

	Feb. 20, 1924	Jan., 1924	Nov., 1923	Feb., 1923
PIG IRON				
Bessemer, valley del., Pitts....	$24.76	24.67	25.47	29.57
Basic, valley	22.00	21.40	20.80	26.10
Basic, eastern del., eastern Pa...	22.50	22.50	22.60	28.15
*No. 2 foundry, del. Pitts.....	24.76	24.17	23.77	28.77
*No. 2 foundry, Chicago.....	24.50	23.70	23.30	29.75
*Southern No. 2, Birmingham...	23.00	21.60	19.25	24.50
*Southern Ohio, No. 2, Ironton.	24.00	22.90	22.50	28.40
**No. 2X, Virginia furnace.....	26.00	25.00	25.00	27.50
**No. 2X, eastern del., Phila..	24.26	24.26	23.01	30.10
Malleable, valley	23.00	22.00	20.40	27.25
Malleable, Chicago	24.50	23.70	23.30	29.75
Lake Superior charcoal, Chicago	29.04	29.04	28.64	33.58
Gray forge, val., del. Pittsburgh	24.76	23.57	23.27	27.87
Ferromanganese, del., Pitts.....	112.29	113.79	113.79	112.29
SEMIFINISHED MATERIAL				
Sheet bars, bessemer, Pittsburgh.	42.50	42.50	42.50	39.25
Sheet bars, open-hearth, Pitts....	42.50	42.50	42.50	39.25
Billets, bessemer, Pittsburgh.....	40.00	40.00	41.50	38.85
Billets, open-hearth, Pittsburgh..	40.00	40.00	41.50	38.50
FINISHED MATERIAL				
Steel bars, Pittsburgh.....	2.40	2.40	2.40	2.15
Steel bars, Chicago	2.50	2.50	2.50	2.21
Steel bars, Philadelphia.....	2.72	2.72	2.72	2.525

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Feb. 20, 1924	Jan., 1924	Nov., 1923	Feb., 1923
FINISHED MATERIAL (Continued)				
Iron bars, Philadelphia.....	$2.57	2.57	2.62	2.45
Iron bars, Chicago mills.....	2.40	2.40	2.40	2.46
Beams, Pittsburgh.....	2.50	2.50	2.50	2.15
Beams, Philadelphia	2.62	2.72	2.72	2.525
Beams, Chicago	2.60	2.60	2.60	2.31
Tank plates, Pittsburgh.....	2.50	2.50	2.50	2.15
Tank plates, Philadelphia.....	2.62	2.72	2.72	2.525
Tank plates, Chicago.....	2.60	2.60	2.60	2.31
Sheets, blk., No. 28, Pittsburgh.	3.75	3.75	3.75	3.35
Sheets, blue anl., No. 10, Pitts.	2.90	2.95	3.00	2.50
Sheets, galv., No. 28, Pittsburgh	4.90	4.95	4.85	4.35
Wire nails, Pittsburgh.....	3.00	3.00	3.00	2.75
COKE				
Connellsville furnace	4.00	3.80	3.80	7.20
Connellsville foundry, ovens....	5.00	4.35	4.85	8.60
OLD MATERIAL				
Heavy melting steel, Pittsburgh.	21.50	21.10	15.70	23.40
Heavy melting steel, eastern Pa.	19.00	18.15	15.50	21.20
Heavy melting steel, Chicago...	18.00	17.40	13.80	19.75
No. 1 wrought, eastern Pa....	21.50	20.10	17.75	24.10
No. 1 wrought, Chicago.....	17.50	17.50	14.10	20.50
Rails for rolling, Chicago.....	20.00	18.90	15.10	22.00

Composite Market Average

Representing the Combined Average Prices Per Ton of Fourteen Leading Iron and Steel Products Yesterday, One Week, One Month, Three Months, One Year and Ten Years Ago.

Feb. 20, 1924	Feb. 13, 1924	Jan., 1924	Nov., 1923	Feb., 1923	Feb., 1914
$43.53	$43.53	$43.26	$42.81	$42.61	$25.53

Products Included Are Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

and 250 tons of northern iron to the Lunkenheimer Co., Cincinnati. The Crown Pipe & Foundry Co., Jackson, closed for 1000 tons additional for second quarter. The Superior Gas Engine Co., Springfield, O., bought 300 tons of northern. The Muncie Foundry & Machine Co., Muncie, Ind., is credited with a like tonnage of the same grade. The American Radiator Co., bought 8000 tons of iron for its plants at Springfield, O., Birmingham Ala., and Litchfield, Ill. The company bought 3500 tons of valley iron, 3000 tons of southern iron and 1500 tons of Chicago iron which goes to the Litchfield plant.

Slower at St. Louis

St. Louis, Feb. 18.—While sales of pig iron have not been large the melt is holding up fairly well, and all classes of consumers appear anxious second quarter, and a car builder is asking prices on 400 to 500 tons for shipment through the balance of February and March. Other inquiries range from 100 to 250 tons, and total about 1000 tons.

Heavy Buying Has Ended

Philadelphia, Feb. 19.—Pig iron buying this past week has been fair but this was largely the tail-end of the recent heavy buying movement. The market now is quiet. It is understood that a Trenton, N. J., consumer took an additional 2000 tons of foundry iron. A South Philadelphia consumer is expected to buy a round tonnage shortly. It is understood also that considerable additional pipe iron has been bought but mostly for other than this territory. Less is heard about foreign pig iron because higher ocean the best grade of English copper-free, the minimum is $28, duty paid tidewater. It is expected that the Reusens, Va., furnace of the E. J. Lavino Co. producing foundry iron, will be blown out in March.

Firmer in South

Birmingham, Ala., Feb. 18.—Pig iron is still available at $23 Birmingham, for No. 2 foundry, but several interests are asking $23.50 and $24 and report sales at those prices. The Alabama Co., producing machine-cast and special brand iron has been selling in small lots at $24. A few inquiries have asked third quarter delivery but only a small tonnage has been sold. Some spot business is still being done lots of one to three cars bringing the highest price for quick delivery. Some iron is moving into Cincinnati territory but on old contracts.

Iron and Steel Prices

SCRAP PRICES, PAGE 570, WAREHOUSE PAGE 566, ORE, NUTS, BOLTS AND RIVETS AND PIPE PRICES, PAGE 568

Pig Iron

Prices per gross ton

Bessemer, valley	$23.00 to 24.00
Bessemer, Pittsburgh	24.76 to 25.76
Basic, valley	22.00 to 23.00
Basic, Pittsburgh	23.76 to 24.76
Basic, Buffalo	23.00
Basic, del., eastern Pa.	21.50 to 22.75
Malleable, valley	23.00 to 24.00
Malleable, Pittsburgh	24.76 to 25.76
Malleable, Chicago	24.50
Malleable, Buffalo	22.00 to 23.00
Malleable, del., eastern Pa.	24.00 to 24.50

FOUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.25
No. 2 Southern foundry	1.75 to 2.25
No. 2X East'n and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 to 3.25
No. 1 Chicago	2.25 to 2.75
No. 2 foundry Eastern	1.75 to 2.25

No. 1X, eastern del., Phila.	24.76
No. 1X, Buffalo	23.50 to 24.50
No. 2 foundry, valley	23.00 to 24.00
No. 2 foundry, Pittsburgh	24.76 to 25.76
No. 2 foundry, Buffalo	22.00 to 23.00
No. 2 foundry, Chicago	24.50
No. 2 foundry, Granite City	25.50 to 26.00
No. 2 foundry Ironton fur.	23.00 to 24.00
No. 2 foundry, Cleveland, del.	24.50
No. 2 foundry, del., Phila.	23.76
No. 2 foundry, N. J. tidewater	24.13
No. 2X, eastern del., Phila.	24.26
No. 2X, east, N. J. tidewater	24.63
No. 2X, eastern del., Boston	27.15 to 27.65
No. 2X foundry, Buffalo fur.	22.50 to 23.50
No. 2X, Buffalo, del. Boston	27.40 to 28.40
No. 2 southern, Birmingham	23.00
No. 2 southern, Cincinnati	27.05
No. 2 southern, Chicago	29.01
No. 2 southern, Philadelphia	30.80
No. 2 southern, Cleveland	29.01
No. 2 southern, Boston (rail and water)	29.91
No. 2 southern, St. Louis	28.17
No. 2X, Virginia furnace	25.50 to 26.50
No. 2X, Virginia, Phila.	30.27 to 31.07
No. 2X, Virginia, Jersey City	30.54 to 31.54
No. 2X, Virginia, Boston	31.42 to 32.42
Gray forge, eastern Pa.	22.50
Gray forge, val. del., Pitts.	24.76
Low phos., standard, valley	29.00
Low phos., standard, Phila.	nominal
Low phos., Lebanon, furnace	27.00
†Low phos., English, Phila.	27.76 to 28.76
Charcoal, Birmingham	33.00 to 34.00
Charcoal, Superior, Chicago	29.04

Silvery Iron

Jackson County, Ohio, furnace

7 to 8 per cent	32.00
8 to 9 per cent	33.50
9 to 10 per cent	35.50
10 to 11 per cent	37.50
11 to 12 per cent	40.00
12 per cent	42.50

Bessemer Ferrosilicon

Jackson County, Ohio, furnace

10 to 11 per cent	42.50
11 to 12 per cent	45.00
12 to 13 per cent	47.50

Ferroalloys

†Ferromanganese 78 to 82 per cent, tidewater, or furnace first hand and resale	107.50
Ferromanganese, delivered, Pittsburgh	112.29
Spiegeleisen 19 to 21 per cent furnace or tidewater	38.00 to 40.00
†Spiegeleisen, English, delivered tidewater	36.00 to 38.00
Ferrosilicon, 50 per cent contract freight allowed	75.00
Ferrotungsten standard, cents per pound contained	85.00 to 95.00
Ferrochrome, 60 to 70 chromium, 6 to 8 carbon, cents per pound contained, delivered	10.00 to 10.25
Ferrovanadium, 30 to 40 per cent per pound estimated, according to analysis	$3.50 to $4.00
Ferro carbon-titanium, carloads, producer's plant, per net ton	$200.00

†Duty paid.

Coke

Beehive, Ovens

Prices per net ton

Connellsville furnace	$4.15 to 4.50
Connellsville foundry	5.00 to 6.00
New River foundry	10.50 to 11.00
Wise county furnace	4.50 to 5.75
Wise county foundry	5.75 to 6.50
Alabama furnace	5.00 to 6.00
Alabama foundry	5.50 to 6.50

By-Product

Foundry, Newark, N. J., del.	$10.91
Foundry, Chicago, ovens	12.50
Foundry, Boston, delivered	12.50
Foundry, St. Louis	12.50
Foundry, Granite City, Ill.	12.50
Foundry, Alabama	5.00 to 6.50

Semifinished Material

Prices per gross ton

BILLETS AND BLOOMS

4 x 4-inch base

Open-hearth, Pittsburgh	$40.00
Open-hearth, Youngstown	40.00
Open-hearth, Philadelphia	44.17 to 45.17
Bessemer, Pittsburgh	40.00
Bessemer, Youngstown	40.00
Forging, Pittsburgh	45.00
Forging, Philadelphia	49.17 to 50.17

SHEET BARS

Open-hearth, Pittsburgh	$42.50
Open-hearth, Youngstown	42.50
Bessemer, Pittsburgh	42.50
Bessemer, Youngstown	42.50

SLABS

Pittsburgh	$40.00
Youngstown	40.00

WIRE RODS

¼-inch and finer

Wire rods, Pittsburgh	$51.00

Standard extras, $2.50 per ton over ¼-inch; $5 for screw stock; $15 for acid wire rods. Carbon extras, $3 for 0.20 to 0.40; $5 for 0.41 to 0.55; $7.50 for 0.56 to 0.75; $10 over 0.75.

SKELP

Grooved skelp, Pittsburgh	2.35c to 2.40c
Universal skelp, Pittsburgh	2.35c to 2.40c
Sheared skelp, Pittsburgh	2.35c to 2.40c

Shapes, Plates and Bars

Prices per pound

Structural shapes, Pittsburgh	2.50c
Structural shapes, Phila.	2.57c to 2.82c
Structural shapes, New York	2.59c to 2.84c
Structural shapes, Chicago	2.60c
Tank plates, Pittsburgh	2.50c
Tank plates, Philadelphia	2.57c to 2.82c
Tank plates, New York	2.59c to 2.84c
Tank plates, Chicago	2.60c
Bars, soft steel, Pittsburgh	2.40c
Bars for cold finishing, Pitts.	2.55c
Bars, soft steel, Philadelphia	2.62c to 2.72c
Bars, soft steel, New York	2.64c to 2.74c
Bars, soft steel, Chicago	2.50c
Bars, refined iron, Pittsburgh	3.25c to 5.00c
Bars, rail steel, Chicago	2.30c to 2.33c
Bars, rail steel, mill	2.10c to 2.20c
Reinforcing bars, billet, Pitts.	2.40c
Bar iron, common, Phila.	2.57c
Bar iron, common, New York	2.59c
Bar iron, common, Chicago	2.40c
Bars, forging quality, Pitts.	2.65c

Hoops, Bands, Shafting

Prices per pound

Hoops, Pittsburgh, under 5 in.	2.90c to 3.00c
Hoops, Pittsburgh, 20 gage, under 1 in.	3.35c to 3.50c
Bands, Pittsburgh	2.90c to 3.00c
Cold finished steel bars, Pittsburgh base	3.00c
Steel shafting, Pittsburgh	3.00c
Cotton ties, bundle 45 lb. Pittsburgh	$1.68

Rails, Track Material

Standard bessemer rails, mill	$43.00
Standard open-hearth rails, mill	43.00
Relaying rails, St. Louis	27.00 to 32.50
Relaying rails, Pittsburgh	30.00 to 34.00
Light rails, 25 to 45, mill	2.00c to 2.25c
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	3.05c to 3.15c
Spikes, small railroad, Pitts.	3.35c to 3.50c
Spikes, boat and barge, Pitts.	3.50c
Spikes, railroad, Chicago	3.10c
Track bolts, Pitts. Standard	4.00c
Track bolts, Pitts., small	4.75c to 5.00c
Track bolts, Chicago	4.10c
Tie plates, Pittsburgh	2.55c to 2.60c
Tie plates, Chicago	2.60c

Spike, tie plate and truck bolt prices for carlots.

Wire Products

To Jobbers in Carloads

Prices per pound

Wire nails, Pittsburgh	3.00c
Galv'd nails, 1-inch and over	5.25c
Plain wire, Pittsburgh	2.75c
Annealed wire, Pittsburgh	2.90c
Galvanized wire, No. 9 gage, Pittsburgh	3.35c
Barbed wire, painted, Pitts.	3.45c
Barbed wire, galv., Pitts.	3.80c
Polished staples, Pittsburgh	3.45c
Galvanized staples, Pittsburgh	3.80c
Coated nails, count keg, Pittsburgh	2.70c
Woven wire fencing (retailers)	65 off
Woven wire fencing (jobbers)	67½ off

Chain, Piling, Strip Steel

Prices per pound

Chain, 1-in. proof coil, Pitts.	6.00c
Sheet piling base, Pittsburgh	2.55c
Hot rolled strip steel, Pittsburgh stamping quality	2.90c to 3.00c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100-inch and heavier, 0.100-inch and heavier, base	4.75c to 5.00c

Sheets

SHEET MILL BLACK

Prices per pound

No. 28, open-hearth, Pitts.	3.75c to 3.85c
No. 28, bessemer, Pitts.	3.75c to 3.85c
No. 28, open-hearth, Phila.	4.02c to 4.17c
No. 28, open-hearth, Chicago	4.09c to 4.19c

TIN MILL, BLACK

No. 28, open-hearth, Pitts.	3.75c to 3.85c

GALVANIZED

No. 28, open-hearth, Pitts.	4.90c to 5.00c
No. 28 bessemer, Pittsburgh	4.90c to 5.00c
No. 28, open-hearth, Phila.	5.22c to 5.32c
No. 28, open-hearth, Chicago	5.19c to 5.34c

BLUE ANNEALED

No. 10, open hearth, Pitts.	2.90c to 3.00c
No. 10 bessemer, Pittsburgh	2.90c to 3.00c
No. 10, open-hearth, Phila.	3.32c
No. 10, open-hearth, Chicago	3.34c

AUTOMOBILE SHEETS

No. 22 Pittsburgh	5.35c

Tin Plate

Prices per 100-pound box

Tin plate, coke base, Pitts.	$5.50

Iron and Steel Pipe

Base Discounts Pittsburgh to Jobbers in Carloads

	Black	Galv.
1 to 3-inch, butt steel	62	50½
1 to 1½-inch, butt iron	30	13

Boiler Tubes

Less Carload Discounts—Carloads 4 Points Additional

Steel 3¼ to 3¾-inch	38½
Charcoal iron, 3¼ to 4½-inch	5
Seamless hot rolled, 3½ to 3¾-inch	35

Cast Iron Water Pipe

Prices per net ton

Class B Pipe

Four-inch, Chicago	$61.20 to 62.20
Six-inch and over, Chicago	57.20 to 58.20
Four-inch, Birmingham	52.00 to 53.00
Six-inch and over, Birmingham	48.00 to 49.00
Four-inch, New York	65.60 to 66.60
Six-inch and over, New York	60.60 to 61.60

Standard fittings, Birmingham, base, $110.00 6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20; gas pipe fittings, $5 higher.

Class A pipe is $5 higher than Class B.

More Decline in Scrap

All Markets Find Conditions Easier and Quotations Lower in Most Instances—Little Demand but Consumers Have Small Stocks

SCRAP PRICES, PAGE 570

Chicago, Feb. 19.—In its present state of indecision the iron and steel scrap market gives evidence of strength and of weakness. Reasons for strength are more numerous than those for weakness, yet the persistence with which melters refrain from buying is telling. The majority opinion is that activity in melters' plants must eventually make for buying. At the moment, the greatest activity is in specialties and angle bars, steel axles, cut tires, knuckles and couplers having been moving. A dealer has had to pay more than $33 for axles. Crane Co. has been a buyer of cast scrap. Rolling mill grades continue inactive. Melting steel remains at $18 to $18.50, with mills not buying and dealers holding. Railroad offerings include 8400 tons by the Louisville & Nashville, 3000 by the Rock Island and 700 by the Monon.

Bethlehem Buys Tonnage

Boston, Feb. 19.—With the exception of a recent inquiry from the Bethlehem Steel Co. for heavy melting steel the iron and steel scrap market in New England is quiet. The Bethlehem inquiry has caused considerable buying not only against this particular lot but among dealers for speculative purposes. Prices of heavy melting steel have recently advanced from about $14.25 to $14.75 shipping point with a few sales reported as high as $15. Another Pennsylvania consumer has been in the market for stove plate but with the exception of a few sales at $13.25 on cars New England shipping point, trading in this grade has been quiet. Demand for foundry scrap has dropped off since the lively buying of about a week ago. Prices have also declined slightly and $23 delivered is now the high point for No. 1 machinery. Strictly textile machinery scrap demands $23.50 delivered. Bundle skeleton has recently sold at $11.25 and blast furnace borings and turnings hold steady at the same figure. Car wheels from Havana have been reaching the Boston market.

Prices Lower in the East

Philadelphia, Feb. 19.—Iron and steel scrap is somewhat more freely offered here but consumers generally are indifferent. Prices are slightly lower in many grades, though the change is not marked.

Market Steady at Detroit

Buffalo, Feb. 19.—With mills temporarily out of the market, trading is confined to dealers, who are buying actively but prices generally remain firm. Dealers' stocks are not large.

Less Activity at New York

New York, Feb. 19.—Trading in iron and steel scrap has undergone a slump, with reductions in several grades. No. 1 railroad and heavy melting steel are off at least $1, and substantial reductions have been made in borings and turnings and wrought material. The Bethlehem Steel Corp. is now placing little new business, and such scrap as is going to the Alan Wood Iron & Steel Co. is being bought by dealers at reduced prices. Heavy melting steel for that company is being purchased at around $18, delivered. Turnings are going to Harrisburg, Pa., and Phoenixville, Pa., at $16, delivered. The situation in cast scrap is listless, with quotations nominally weaker, but unchanged.

Prices Less at Cleveland

Cleveland Feb. 19.—Scrap prices have slid off within the past week as a result of light buying. Users are not interested in new tonnage because of having satisfied requirements, many being well covered into next month on most grades. This is particularly true of consumers of borings and turnings. Prices, except for malleable, have been marked down. Heavy melting steel is down 25 cents to $19 to $19.25; machine shop turnings, down $1 to $15 to $15.25; cast borings, off $1.75 to $15.25 to $15.50.

Inactive at Pittsburgh

Pittsburgh, Feb. 19.—The inactive scrap market continues to bring out distress tonnages and some small lots of heavy melting steel have been disposed of on track at low figures. In the absence of consumer buying that grade is quotable at $20.50 to $21, dealers having paid $20.50 and the maximum figure being the basis of the last sale made to a consumer here. A tonnage buyer today could possibly close at around $21. On the other hand dealers bidding $22.25 for the heavy melting steel on the list of the Norfolk & Western railroad, which closed last week, failed to obtain a part

(*Concluded on Page* 533)

Seek Next Quarter Steel

Some Users of Semifinished Material Trying To Figure Costs—Consumption Proceeding at Heavy Rate—Prices Firm

SEMIFINISHED STEEL PRICES, PAGE 517

Youngstown, O., Feb. 19.—Buying demand in the semifinished market is dull. The week just closed was barren of inquiry for sheet bars but was attractive from the standpoint of specifications which came out in good volume from consumers depending on district mills for their supply. Unless some unexpected change occurs no spot sheet bar tonnage will be available from mills in this district until next quarter. No new sheet bar business will be considered by local producers during the remainder of this quarter, where open-hearth quality is desired, but in the case of bessemer sheet bars any tonnage can be had. Prices continue unchanged at $42.50, Youngstown or Pittsburgh.

Demand Is Increasing

Buffalo, Feb. 19.—Steady and increasing demand is shown for billets and sheet bars. A local mill is selling some rods, and finds the market strong at $51 base, with extras for carbons. A good demand is noted for off-size and off-analysis rods.

Billet Sales Small

Philadelphia, Feb. 19.—Billet sales are restricted to small and moderate lots which bring $40, Pittsburgh, for rerolling grades and $45 for forging quality, although some irregularities have occurred.

Seek Second Quarter Tonnage

Cleveland, Feb. 19.—Interest is developing in sheet bars, billets and slabs for second quarter, while specifications on first quarter tonnages are heavy and some users would like to make substantial increases in their allotments. Thirty thousand tons or more of sheet bars and billets could be written on books now for second quarter delivery, if makers were disposed to name prices. Nothing additional is available from the leading production source in this territory for first quarter. Some lots of forging billets have been sold here in the week at $45, Pittsburgh. Sheet bars still are quotable at $42.50, and billets at $40, Youngstown.

Better Inquiry at Pittsburgh

Pittsburgh, Feb. 19.—Inquiries are appearing for some second quarter semifinished material but as yet there has been no formal announcement of prices for that period. The general expectation is that the sheet bar price will be $42.50, Pittsburgh or Youngstown which has been the market level throughout the first quarter. The average price on sheet bars for the first quarter for some producers was no more than $41.25, however, since some large orders were taken at the $40 price late last year. Other producers who named the $42.50 figure in their contracts for the first quarter expect the same figure or a higher one to apply during the second quarter. A few of the inquiries that are coming out involve large tonnage.

Billets and slab inquiry also is commencing to show itself, buyers usually wanting 1000 or 2000 tons at a time. The present market price on 4 x 4-inch rerolling billets is $40 while that same level has been made on small billets. The possibility is that the regular differential of $2.50 will be asked on second quarter supplies of small billets. Slabs are firm at $40 and one or two blue annealed sheet makers are seeking tonnage. Specifications have been unusually regular and some buyers have exceeded the tonnage called for in their contracts. One or two sheet bar conversion plants doubled their January quotas, the mills permitting this to be done at the same figure without affecting the remainder of the tonnage due; February quotas are being specified this week and March tonnages will come along in due time. This also applies to forging billets and some forging billet buyers are specifying double the amount called for by their contracts, some mills accepting additional tonnages

at the same figure, $45 Pittsburgh, without subtracting it from the total tonnage called for by the contract.

Some attractive wire rod inquiry came out the past week including one from a rivet maker for 2000 tons. On these inquiries $51 Pittsburgh has been quoted by those in position to quote, some producers needing all their tonnage for regular customers or in their own finishing department. Skelp is interested at 2.35c to 2.40c, Pittsburgh.

Light Sales

Characterize Ferroalloy Market At Present—Indian Chrome Ore Sold

FERROALLOY PRICES, PAGE 517

New York, Feb. 19.—Several hundred tons of domestic spiegeleisen have been sold during the past week. New demand is fairly quiet. The market continues at $38 to $40 furnace for 20 per cent metal. No further sales of English spiegeleisen are reported. While it is stated some further English spiegeleisen is available, offers of this metal will not be of a continuous character.

Demand for ferromanganese is very dull and developments during the past week have been of little importance. The asking price on ferromanganese continues $107.50 duty paid tidewater.

In spiegeleisen, the local market is practically devoid of inquiry and sales. One sale of 70 tons is noted to an eastern user who took 16 to 19 per cent material at $39 furnace, the 19 to 21 per cent grade being quoted at $40 furnace.

Rising prices for scrap are forcing higher quotations on the 14 to 16 per cent electric furnace ferrosilicon. An inquiry for 1000 tons is reported from the middle west, for account of an automobile maker, with $43, furnace bid. Carlot sales of 50 per cent are being made at $75, delivered. Tungsten ore prices are stronger at $8.50 a short ton unit, for average Chinese wolframite. Ferrotungsten quotations are unchanged at 86 to 90 cents a pound contained. Ferrochrome quotations are unchanged as published. A sale of 1000 tons of Indian chrome ore for April-May shipment from India was made at $19.50, c.i.f. Atlantic port.

Sales and Inquiries Normal

Pittsburgh, Feb. 19.—Practically a normal rate of orders and inquiry is noted by sellers of ferromanganese from day to day. Specifications against orders placed prior to Feb. 1 are heavy so that consumption apparently is proceeding at a high rate. The majority of sales arranged during the past several days involve below 200 tons each although a few 200 or 300-ton lots were again included. All this business has been done at the $107.50 seaboard base figure maintained by the domestic producer. Offers to pay it $106.50 have again been received but so far have not proven tempting to sellers. Some middle interests have endeavored to buy at $106.50 and one western consumer claims to be able to close at $106, but for the time being the market remains quotable at $107.50, seaboard base, for domestic and $107.50 c.i.f. Atlantic seaboard duty paid on material imported from England. Some users have bought ahead as far as the third quarter and one or two as far as the fourth quarter on an attractive basis. Much material however, remains to be purchased for the second and third quarters.

Coke Market Is Stronger

Spot Offerings of Furnace Grade Limited, and Minimum Is $4.15—Ovens Making Foundry Grade Becoming More Active

COKE PRICES, PAGE 517

Pittsburgh, Feb. 19.—More strength is shown in the beehive coke spot market as the present output is entirely obligated. Spot offerings accordingly are limited. The minimum price now is $4.15 instead of $3.75. Sales on those bases involving up to 50 carloads were noted in the past week. Off-grade coke was offered at $3.75. Heating coke, or first drawing, is available as low as $3.35. Contracting interest in standard furnace coke is growing. The Rogers, Brown Iron Co., Buffalo, has purchased part by-product and part beehive coke for second quarter. The by-product price is reported equivalent to about $4, Connellsville base. The Struthers Furnace Co. purchased a portion of its second quarter requirements below $4.50. The Sharon Steel Hoop Co. is understood to be negotiating for by-product coke. The Shenango Furnace Co. was a recent purchaser in the spot market. It may make periodic entrances for auxiliary tonnages to help out contract shipments. A local broker is offering to pay a prominent maker $4.40 for several thousand tons for March shipment, apparently negotiating with a blast furnace willing to pay $4.50 or higher. One large shipper's active plants are sold up for first quarter, and partially so for second. Lately its contract price has been $4.50, although that is not the average of its bookings, some being closed at $4.40 and others at $4.25. Some eastern furnaces are issuing tentative inquiries. Other users are awaiting classification of the pig iron market before closing up second quarter fuel needs. Merchant oven operators are not putting in additional ovens until the $4.40 price is more common. Some foundry coke ovens are becoming active, the Trotter plant of the A. C. Frick Co. putting in 25 in the past week. Foundry coke demand is fair spot tonnage selling at $5 to $5.75. Contracts are taken at $5.50 to $6.50. Most spot requirements are in single carloads. Contracts are for one to five carloads weekly.

Production, acording to the *Connellsville Courier*, for the week ended Feb. 9 was 220,090 tons as compared with 218,180 tons the preceding week.

Eastern Market Steady

New York, Feb. 19.—Demand for coke while not large continues steady and prices are fairly firm. The market may be quoted at $5.25 to $5.75, Connellsville, on standard beehive foundry coke for spot shipment, while the higher prices are being done on special brands. On standard by-product foundry coke the market continues $10.91, delivered at Newark and other northern New Jersey consuming points.

Foundry Demand Is Feature

Cincinnati, Feb. 19.—Demand for foundry coke is the outstanding feature here, while domestic and furnace grades are less active than in several weeks. A leading seller reports that its foundry coke shipments for February probably will exceed 15,000 tons. A shortage of railroad cars is delaying shipments from the Wise county and New River fields. Sales involve 17 cars of New River foundry coke and 200 tons of Wise county foundry fuel.

By-Product Stocks Increase

St. Louis, Feb. 19.—With a return of mild weather demand for domestic coke has eased up. Dealers' stocks have increased and reserves in hands of by-product makers are heavy. Melters are buying what they require from month to month, getting their supplies principally from the by-product ovens. Shipments from the East have been the smallest for this season in a number of years.

Market in South Improving

Birmingham, Ala., Feb. 18.—While production is unchanged, the coke market is improving. Considerable coke is moving at low prices. Beehive foundry is quoted at $5.50 to $6.50, while the by-product grade can be purchased at $5.

Warehouse Trade Steady

WAREHOUSE PRICES, PAGE 566

Cleveland, Feb. 19.—An advance in cold-rolled rounds is forecasted by local jobbers in iron and steel. New extras are expected to be brought out either for March or for second quarter business. An advance on rounds and reduction on hexagons is expected. Manufacturers are buying for present needs only. Automotive products manufacturers have adopted a 30-day buying schedule as compared with a three-month basis during the past. Some additional shading is noted on galvanized sheets, some interests cutting to 5.85c to obtain business. Prices on other stock goods are firm.

Open Weather Aids Market

New York, Feb. 19.—Open weather continues to contribute chiefly to an unusually good warehouse market. Most all descriptions are moving freely. Since the recent advance in black and galvanized sheets little change is noted in the principal items. A closely similar situation applies to mill supplies.

Some Shading Being Done

Philadelphia, Feb. 19.—Jobbers report a continued fair demand for iron and steel products out of warehouse. Prices are unchanged on the general run of business but some shading is being done. This as usual is scattered, applying mainly to attractive lots.

Demand Continues To Broaden

Detroit, Feb. 19.—Continued broadening of demand is apparent among warehouse dealers, due to inability of large producers to make deliveries on schedule. Prices are steady, but firm. A tendency to increase tonnage is shown by many consumers. Buying of bars is unusually liberal mainly due to inability of consumers to get quick delivery from mills. Buying of galvanized sheets also is active, especially on grades used by out door advertising firms.

Bar Mills Fall Behind

Consumers Find Deliveries Receding and Cover for Longer Period—Second Quarter Requirements Being Contracted

BAR PRICES, PAGE 517

Pittsburgh, Feb. 19.—Merchant steel bar specifications are heavy in the aggregate although many buyers still refuse to anticipate and simply purchase present needs. This condition rapidly is changing, however, as users and jobbers encounter increasingly deferred delivery. It no longer is possible, for instance, to obtain bars particularly in the popular sizes of rounds, even from the Carnegie Steel Co. on two weeks delivery; the best that now can be got is four to five weks and the necessity for anticipating on the part of customers is therefore becoming more pronounced. Jobbers have again been ordering in single carloads or 100 tons at a time from different sections of the country. Details are not available here in connection with the possible bar needs of Japan for its reconstruction program but now since that country's bond issue has been successfully subscribed, the way is open for prompt winding up of the negotiations and in all probability a large tonnage of bars will be purchased. It is understood that in a minor way some of the competitive prices in the East have been met by independent steel producers here although in this section 2.40c, base Pittsburgh, still is the ruling market figure.

Sales At High Level

Boston, Feb. 19.—Bar sales exceed any week in several months. A leading seller reports the best week in nearly a year. Foreign bars and billets have been placed in small lots but not to an extent to affect the market. One interest reports buying several hundred tons of French bars at a price which would enable this material to be laid down in Pittsburgh at 2.30c per pound. Foreign billets have sold at $33 a ton Portland, Me.

Foreign Bars Still Come

New York, Feb. 19.—At least 3000 tons of European bars and small shapes have been sold in this territory during the past week. No details are announced but is is understood the price is around $42 per net ton as 2.10c per pound duty paid tidewater. It is known that considerable additional business in foreign steel is under negotiation.

Want Second Quarter Steel

Cleveland, Feb. 19.—Some requests from consumers for bar tonnage for second quarter are coming out. While makers are not inclined to entertain contracts for that period they have accepted some tonnage for definite delivery. Generally new business is running in good volume in this territory. The number of individual orders has been larger the past week even though the total tonnage is reported by some makers to have been less. Deliveries vary according to sizes and generally are no more extended than a week ago. Large bars 1 inch and over and spring steel are obtainable the least speedily and deliveries run up to eight weeks. For the general assortment, three to four weeks are representative. Except under special circumstances, steel bars are holding well at 2.40c, base Pittsburgh. Wide bands, particularly those rolled on strip mills, show some deviation from 3.00c, Pittsburgh, the minimum price on other bands. Hoops are firm at 3.00c, Pittsburgh and upward.

Demand Continues Fair

Philadelphia, Feb. 19.—Demand for steel bars in Eastern territory continues fair. Most business is going at 2.40c, Pittsburgh, but some shading is being done on attractive orders.

Strong Buying at Chicago

Chicago, Feb. 19.—Buying of soft steel bars continues heavy. Order books reveal that many users are specifying a larger tonnage than they contracted for. In some cases the additional tonnage is one-third of the original booking. Implement manufacturers are steadily enlarging their operations, and buying of implements in the Northwest is greatly increased. Chicago mills this season will furnish more steel to automotive interests in Michigan than ever before. Railroad freight car builders continue to be big factors, the Pennsylvania railroad inquiry for 9000 cars calling for upwards of 80,000 tons of plates, shapes and bars. The leading maker has taken substantially all the railroad car business in this district recently. By all odds soft steel bars are the most active finished product and bookings far exceed shipments. The quotation is 2.50c, Chicago.

Bar iron demand is no better and mills occasionally are hard put to maintain single-turn operations. The quotation is 2.40c, Chicago.

Bolts, Nuts, Rivets Still Shaded

NUT AND BOLT PRICES, PAGE 568

Chicago, Feb. 19.—A large maker of bolts and nuts continues to quote 60 and 10 off for large machine bolts for a portion of the business coming before it, but is gradually swinging over to 60 and 5 off. Probably most business is on the higher level. Automotive interests continue heavy buyers. Agricultural implement manufacturers are not buying as much as a few weeks past, but this is regarded as temporary.

Rivet Prices Being Shaded

Philadelphia, Feb. 19.—Rivet prices continue easy with 2.75c, Pittsburgh, being done frequently on carloads while in some cases lower has been obtained. Bolts continue to be quoted at 60 and 10 off for large machine size and this price is fairly well maintained. Small spike, prices are being cut, this product bringing around $3.25c, Pittsburgh.

To Extend Ensley Works

Birmingham, Ala., Feb. 19.—Important additions to the works of the Tennessee Coal, Iron & Railroad Co. at Ensley have been decided upon by the United States Steel Corp. Extensions include additional open-hearth capacity and expansion of the finishing mills.

Orders for Brick

Crowding Makers of Refractories—Operations Above 85 Per Cent

Pittsburgh, Feb. 19.—Consumption of refractories continues at a high rate as indicated by orders and specifications received by brickmakers from numerous lines of manufacture, particularly iron and steel. Numerous producers are maintaining operations as near 100 per cent as possible, the general average being above 85 per cent. Shipments by a large number are keeping up with production. Producers believer users waited too long in placing business. Orders are coming out so fast that they are crowding the makers, since shipments are wanted immediately. Brick stocks are not unduly large when special shapes are subtracted, and many bricks have to be made up after specifications are received. Orders for fireclay and silica usually involve 50,000 to 250,000 at a time, with an occasional larger quantity wanted for repairs or for blast furnace linings. Some new blast furnace construction promises to furnish even larger orders within the next week or two.

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. works

Pennsylvania, No. 1	$42.00 to 45.00
Pennsylvania, No. 2	35.00 to 38.00
Ohio, No. 1	42.00 to 45.00
Ohio, No. 2	35.00 to 38.00
Illinois, No. 1	45.00 to 48.00
Illinois, No. 2	42.00 to 44.00
Kentucky, No. 1	42.00 to 44.00
Kentucky, No. 2	37.00 to 39.00
Missouri, No. 1	38.00 to 40.00
Missouri, high grade	48.00 to 50.00
Maryland, No. 1	44.00 to 51.00
Maryland, No. 2	40.00 to 42.00

SILICA BRICK

Pennsylvania	40.00 to 42.00
Chicago	49.00

MAGNESITE BRICK

Birmingham	50.00

Per Net Ton Seaboard Base

9 x 4½ x 2½	$65.00

CHROME BRICK

(Per Net Ton)

9 x 4½ x 2½	$47.00

Prices are unchanged and if anything, are a trifle firmer, it being increasingly difficult to locate prices on silica brick below $42. It is understood that approximately 75 per cent of the silica brick producing capacity will not name any quotation below $42 minimum. Additional spot orders for chrome brick continue to be filed at the going market figure of $47 from time to time, and specifications are attractive on contracts placed at slightly lower figures. Several magnesite brick orders placed recently involve one, two or three carloads at a time. The price on magnesite is firm at $65.

Buys Steam Shovels

An order has been placed by the Oliver Iron Mining Co., subsidiary of the United States Steel Corp., for

three 50-ton and one 100-ton steam shovels. The orders went to the Bucyrus Co., South Milwaukee, Wis. The shovels are for use in iron ore mining in the Lake Superior district.

Wire Demand Steady

WIRE PRICES, PAGE 517

Chicago, Feb. 19.—Buying of wire and wire products by jobbers is less than was generally expected. This is attributed to the fact that prompt delivery can be had and jobbers appear content to let the mills carry the load. Sales of wire and wire products for manufacture are good. Prices and operations are unchanged.

Better Demand At Boston

Boston, Feb. 19.—Demand for wire has improved sharply during the past week and several round tonnage orders have been placed. An improvement is also reported for nails and other wire products and rods. One order for 500 tons of rods is reported.

Buffalo Mills Gain

Buffalo, Feb. 19.—Mill operation in the local territory has been increased extensively in the past two weks. The Lackawanna plant of the Bethlehem Steel Corp. has placed its plate mill in operation, thereby putting itself on 100 per cent mill operation. Open-hearth operation shows 19 out of 24 furnaces active. The job of motorizing the blooming mill will be completed within six weeks. Brickwork on one of the new coke oven batteries is 60 per cent complete, and on the other battery, 40 per cent complete. It is expected these batteries will be in production by June.

The Wickwire Spencer Steel Corp. is operating its open hearths 100 per cent, and mill and blast furnace operations are at capacity. The Seneca Iron & Steel Co. has 12 of its 14 sheet mills in operation.

Light Another Gary Stack

Chicago, Feb. 19.—The Illinois Steel Co. has lighted another stack at Gary and now has active 11 stacks at Gary, nine at South Works and three at Joliet, a total of 23 active out of its 27 steelworks blast furnaces. Plans are to light another stack at Gary within a few days, making all 12 there in blast. General operations of Illinois Steel range from 93 to 95 per cent. The Inland Steel Co. continues to operate as near capacity as mechanical conditions permit.

Rail Mill at Capacity

Pueblo, Colo., Feb. 19.—The Colorado Fuel & Iron Co. has started operations on full turns this week in its rail mill as sufficient orders have been booked to maintain this schedule until midsummer. The Chicago, Burlington & Quincy and the Atchison, Topeka & Santa Fe have placed large rail orders with this company. Other departments of the company are operating at single turns only.

Fire Equipment & Marine Supply Co., Cleveland has increased its capital stock from $15,000 to $25,000.

Plate Specifications Good

Business Sufficient To Engage Leading Mills at 90 Per Cent—Large Tonnage Placed for Car Orders—Many Locomotives Pending

PLATE PRICES, PAGE 517

Pittsburgh, Feb. 19.—Specifications on plates coming to large makers here enable them to operate their plate-making departments at around 90 per cent of capacity. This is true despite the light oil storage tank business which awaits improved weather, a better oil market and a clarification of the oil situation. Comparatively few tank plates are now being shipped but plates for cars and locomotives as well as for building construction are active. Most large makers are firm at 2.50c, base Pittsburgh, although some of the competition offered in the eastern district has been met by local sellers naming 2.40c and even a trifle less. The Carnegie Steel Co. continues to maintain the 2.50c price level. The open market figure remains 2.50c, base Pittsburgh. Additional orders from car builders are expected following the recent contemplated placements of car orders by the Pennsylvania, New York Central and other roads.

The Carnegie company has booked 50,000 tons of plates, shapes and bars for axles and wheels for the 4000 Norfolk & Western cars recently placed.

French Plates Sold

Boston, Feb. 19.—The Standard Oil Co. has placed contracts for 2000 tons of steel, mostly plates, for tanks located at various New England points. This business was divided between the Warren City Tank & Boiler Co. and the Petroleum Iron Works. Plate orders of the past week have shown an increase. One buyer reports having placed an order for French plates the price of which was around 2.00c, tidewater. The plates laid down at Pittsburgh would be equivalent to a price of about 2.20c.

Locomotive Tonnage Large

Philadelphia, Feb. 19.—Eastern plate demand generally is maintained at the improved rate of last week though no outstanding tonnages have been closed. Eastern railroads have released more tonnage but demands mostly are from miscellaneous sources. The price range generally is from 2.30c to 2.40c, Pittsburgh, depending upon the desirability of the order. More locomotive inquiry has come out including the Main Central for 8, Nickel Plate for 20, Atlantic Coast Line for 20, International Great Northern for 3 or 4, New York Central for an indefinite number of passenger types and the Union Pacific for 25. This business involves fully 7000 tons of plates. Pittsburgh mills have been filled up to the extent which makes them less active in the eastern market.

Price Irregularity Persists

Cleveland, Feb. 19.—New tonnage in plates appears to be lagging behind that of other heavy finished products and this fact is reflected in some continued irregularity in prices. While the open market remains 2.50c, Pittsburgh, on attractive orders and where certain mills are desirous of establishing themselves in the good graces of consumers, $2 per ton concessions are being made here and there. It is reported some large consumers have been able to get a price as low as 2.30c, Pittsburgh, but whether this represents an extension of an old contract or not, is not known. Cleveland mills have taken about 1000 tons of boiler and firebox steel for the New York Central locomotive order recently placed with the Lima Locomotive Works, while Pittsburgh mills will furnish the 500 to 600 tons of tank steel. Some miscellaneous new inquiry for oil stills from the Utah Refining Co. and others has appeared. A round tonnage of plates will be required for two steel ferries for the Algiers Public Service Co., New Orleans, which have been awarded to the Howard Shipbuilding & Dock Co., Jeffersonville, Ind.

Rely Mainly on Car Business

Chicago, Feb. 19.—Demand for steel plates for freight cars continues the chief mainstay of the local plate market. A good, steady demand for merchant plates is evident but the activity in this product in general does not measure up to that in bars and shapes. At present no large oil storage tank projects are out. The plate price still is 2.60c, Chicago.

Heavy Consumption

Continues in Tin Plate—Can Makers Take Large Tonnage

TIN PLATE PRICES, PAGE 517

Pittsburgh, Feb. 19.—Tin plate consumption continues at a high rate as well as production which is made possible by the rate at which specifications are coming in. Some additional specifications due Feb. 15 were early, some came on time and a few of them were late as usual but the last were not needed because the former were so heavy. Enough tonnage is backlogged to enable many mills to operate at a high rate for several weeks. Some large operations are maintained at 95 per cent or better and the general average of all tin plate mill operations is in excess of 90 per cent. Commitments of tin plate producers to can makers are heavy and shipments against these require large tonnages since the fruit and vegetable pack this year is expected to be abnormally large. Since the American Sheet & Tin Plate Co. announced last November its $5.50 price only for the first quarter but protected many consumers for the first half on that basis, the reaffirmation of that level for the second quarter is more or less a matter of form.

Security Trust Co., Detroit, has been appointed receiver for the Advance Aluminum Die Casting Co., 3925 Fort street west, that city. Receiver announces that business will not be continued under receivership but that sale of property, as going concern will be sought.

Concrete Market Stronger

Inquiries Continue To Come Out in Large Volume but Buyers Hesitate To Close—Spring Trade Expected To Strengthen Prices

REINFORCING BAR PRICES, PAGE 517

Cleveland, Feb. 19.—Inquiries for reinforcing concrete bars are coming out in larger quantities although mostly for small tonnage lots. Little activity is noted in the city although pending work in this territory involves several thousand tons. Two 14-story buildings at Huntington, W. Va., were projected for figures last week, each requiring about 100 tons of bars. Local dealers are not booking heavily but fabricators selling throughout this district have busy estimating departments. Reinforcing bars from stock are quoted at 2.75c, Pittsburgh, with a considerable tonnage going at about 2.80c, Pittsburgh. Several dealers expect second quarter business to bring higher than 2.75c, Pittsburgh. New steel bars continue to be quoted from 2.30c to 2.40c, Pittsburgh, with rail steel going at 2.10c, mill. Little business is being done to test the strength of either quotation. A good demand from manufacturers exists for hard steel angles.

Belgian Bars Cutting Market

Boston, Feb. 19.—Approximately 1000 tons of Belgian concrete bars has been offered to New England consumers in small lots around 2.00c, Boston, duty paid. Domestic prices are soft with some recent contracts being let below the usual mill figures. At least 1500 tons was placed last week with about 2000 tons still up for figures.

Projects Beginning To Break

Chicago, Feb. 19.—Signs are not lacking that much reinforcing bar business that has been hanging fire for some weeks is about to turn into actual placements. English Bros., Champaign, Ill., has been awarded the general contract for four buildings at the University of Illinois, which will take about 400 tons of bars. About 1130 tons of bars for Indiana road work probably will be awarded shortly. The Roberts street bridge at St. Paul is before local bar interests, and may take 500 tons for the superstructure. Probably a greater tonnage will be required for a stadium by the University of Minnesota at Minneapolis. A number of projects in Texas are coming out. A report from St. Paul forecasts nearby reinforcing bar awards at from 5000 to 6000 tons in that vicinity. The sanitary district in Chicago is reported again figuring on construction entailing the use of 500 to 600 tons of bars. The general going quotation on reinforcing bars now seems to be 3.00c, Chicago.

The Soo Line railroad ore dock extension at Ashland, Wis., may take over 1000 tons of reinforcing bars while the Michigan Central railroad will require over 100 tons for grade elimination work at Springwells, Mich.

Small Lots Still Rule

Cincinnati, Feb 19—Small lots continue to rule in the reinforcing concrete bar market here, but some fair sized business lately has come before local interests. The 200 tons for an addition to the plant of Merkel Bros., manufacturer of plumbing supplies, Cincinnati will be placed the coming week, as will the tonnage for the brass finishing plant of Standard Sanitary Mfg. Co., at Louisville, Ky. A large amount of bars for Ohio and Kentucky work is in prospect and projects involving more than 1000 tons may be placed shortly. The 2.40c base Pittsburgh, price is fairly well maintained on mill shipments, although lower is being done on attractive tonnages

CONCRETE CONTRACTS PLACED

Awards this week	**2,807 tons**
Awards last week	**8,078 tons**
Awards two weeks ago	**2,750 tons**

900 tons, substructure for power house near Cincinnati for Columbia Gas & Electric Co., to Bourne-Fuller Co.

350 tons, government hospitals, Livermore, Cal., to W. S. Wetenhall & Co.

350 tons, Desmond store building, Los Angeles, to Badt-Falk Co.

300 tons, addition to Hotel Metropole, Cincinnati, to Pollak Steel Co.

300 tons, building for S. D. Childs & Co., Chicago, to Joseph T. Ryerson & So, Inc.

150 tons, foundations for Elks Lodge building, San Francisco, to Badt-Falk Co.

125 tons, Security Bank building, Chicago, to Kalman Steel Co.

120 tons, hotel at Henderson, Ky., to Pollak Steel Co.

112 tons, Roosevelt road viaduct, Chicago, to Joseph T. Ryerson & Son, Inc.

100 tons, Illinois highway work, to Joseph T. Ryerson & Son.

100 tons, Chicago Riding club, Chicago, to Joseph T. Ryerson & Son, Inc.

CONCRETE CONTRACTS PENDING

1000 tons, warehouse for Kaufman & Baer Co., Pittsburgh, to be bought by John Eichleay Co.

775 tons, Metropolitan hotel, Los Angeles; bids in.

500 tons, athletic stadium, University of West Virginia, Morgantown, W. Va.; general contract awarded Osborn. Engineering Co.

500 tons, post office on Embarcadero, San Francisco; bids being received. MacDonald & Kahn awarded general contract.

350 to 1650 tons, plant for Pacific Portland Cement Co., Redwood City, Cal.; bids being received. Foundation Co. general contractor.

200 tons, Bolivar Square garage, Fourteenth street and Bolivar road, Cleveland; Austin Co., general contractor.

150 tons, hotel at Palo Alto, Cal.; bids received.

140 tons, Garfield high school, Akron, O.; bids in.

120 tons, filtration plant, Fairmount, W. Va.; general contract awarded Rust Engineering Co.

100 tons, store building, Twentieth and Webster streets, Oakland, Cal.; bids being received.

100 tons, Epp Furniture Co., Erie, Pa.; pending.

100 tons, 14-story bank building for Union Bank & Trust Co., Huntington, W. Va.; pending.

100 tons, 14-story building for Cole Exchange, Huntington, W. Va.; pending.

100 tons, Coraopolis high school; general contract to Kilpatrick-Dawson Co.

Pipe Mills

Are Accumulating Good Backlogs—Iron Pipe Extras Are Advanced

PIPE PRICES, PAGE 517 AND 568

Pittsburgh, Feb. 19.—Jobber demand still remains the feature of the tubular goods market as regards standard full weight merchant pipe. Small but numerous orders continue to be placed with various mills, which are accumulating good backlogs. Shipments are fairly heavy into those sections where consumption has not been interfered with by weather conditions. Many such orders are for replacements. Jobbers' efforts to accumulate stocks have been so widespread and so numerous that mills themselves are hardly able to build up their own stocks. Improvement in oil country goods continues most orders calling for a carload or two at a time. Line pipe business for large installations still remains in the background, line pipe orders for about 5000 feet at a time being typical.

Late last week and effective immediately, the A. M. Byers Co. announced the following extras for standard, extra heavy, and double extra heavy wrought iron pipe, black or galvanized, ordered plugged and reamed:

4-points on sizes ¼, ⅜, ½ and ¾ inch.

2-points on sizes 1 inch and larger.

These extras on sizes ¼ to ¾ inch inclusive, supersede the extras shown on its Jan. 23, 1923 discount card, which are to the effect that a charge of two points on all sizes apply for pipe ordered plugged and reamed.

Large Inquiries Expected

New York, Feb. 19.—A large quantity of cast iron pipe amounting to several thousand tons, is to be brought out shortly by local gas companies. Among the largest inquiries out is 4000 tons for the department of water, gas and electricity. One job, requiring 2000 tons of 20 and 36-inch general contractors' bids will close Feb. 26; on two other jobs, each involving 1000 tons of 12 to 20-inch general contractors' bids will close Feb. 25 and Feb. 29, respectively.

Considerable other municipal work now is coming out. Bayonne, N. J., closes direct to makers on 500 tons today; Atlantic City, N. J., is figuring on two jobs, involving in the aggregate 750 tons of pipe ranging from 4 to 14 inches; and Youngstown, O., 200 to 300 tons of 6 to 12-inch. Prices are strong, but steady.

Buying Large In Aggregate

Chicago, Feb. 19.—Cast iron pipe is going in spurts, total one week bringing out a large volume of business and the next a rather small total. In the aggregate mills are booking heavily and have between two and three months' work ahead. The United States Cast Iron Pipe & Foundry Co. is understood to be the low bidder on 500 tons for the South Park board, Chicago. James B. Clow & Son on 600 tons at Pontiac, Mich., and the Lynchburg Pipe Foundry Co. on between 500 and 600 tons at Duluth. The National Cast Iron Pipe Co. has taken a small tonnage at Washington, Ind.

Buying Active In South

Birmingham, Ala., Feb. 18.—Cast iron pipe trade in the Birmingham district is active, many awards being reported. The winter buying has been good and shipments of pipe will be steady for some time to come. Business in January and February this year will exceed considerably that of the same period last year. Contracts closed each week total several thousand tons more than is being produced. Quotations have been advanced $1 per ton. Pressure pipe makers have purchased considerable tonnage of iron ahead and indications are that production will be

greater this year than ever before. The sanitary pipe trade also is improving.

CAST IRON PIPE AWARDS

400 tons, Rochester, Minn., to American Cast Iron Pipe Co.
321 tons, 4 to 16-inch class B pipe for Alhambra, Cal., to Pacific Pipe & Supply Co. for French made pipe.
294 tons, work for Holden, Mo., to American Cast Iron Pipe Co.
187 tons, Marinette, Wis., to American Cast Iron Pipe Co.
175 tons, Faribault, Minn., to National Cast Iron Pipe Co.
163 tons, Columbus, O., to American Cast Iron Pipe Co.
100 tons, work for Rockingham, N. C., to American Cast Iron Pipe Co.

CAST IRON PIPE PENDING

4000 tons, department of water, gas and electricity, New York, general contractors' bids being received; 2000 tons of 20 and 36-inch, close Feb. 26; two jobs, each involving 1000 tons of 12 to 20-inch, close Feb. 25 and Feb. 29, respectively.
750 tons, two jobs involving 4 to 14-inch pipe for Atlantic City, N. J.; bids asked.
500 tons, Bayonne, N. J.; bids in.
405 tons, 4 to 14-inch pipe for Gilroy, Cal.; bids open Feb. 25.
300 tons, 4 to 16-inch B for Pasadena, Cal.; bids in.
300 tons, 4 to 10-inch B pipe for Wapato, Wash; bids in.
250 tons, Highland Park, Mich; bids in.
200 and 300 tons, 6 to 12-inch pipe, Youngstown, O.; bids asked.
191 tons, 10-inch B pipe for Los Angeles; bids in.
109 tons, 4 and 6-inch class B pipe for Aberdeen, Wash.; bids in.
Heavy tonnage, Consolidated Gas Co., Brooklyn Union Gas Co., and Queensboro Gas & Electric Co., New York; specifications expected out shortly.

Valley Sheet Mills on 80 Per Cent Basis

Youngstown, O., Feb. 19.—District operation of hot sheet mills this week includes 94 units or three more than were scheduled a week ago. This places the sheet industry here on an 80 per cent basis. The Youngstown Sheet & Tube Co. has 22 hot mills under power at its two divisions, the Newton Steel Co. 20, the Republic Iron & Steel Co. 15, the Trumbull Steel Co. 13, the Sharon Steel Hoop Co. nine, and the Mahoning Valley Steel Co. and the Falcon Steel Co. eight each. The Waddell Steel Co. which recently acquired the Empire Works at Niles, O. expects to start operations early in March.

Independent steelworks activity is at 92 per cent of capacity which rate has been maintained since the beginning of this month. Forty-seven open hearths are represented in the current schedule, 22 being charged by the Youngstown Sheet & Tube Co., 13 by the Republic Iron & Steel Co., seven by the Trumbull Steel Co. and five by the Sharon Steel Hoop Co.

In addition to the foregoing the Youngstown Sheet & Tube Co. is operating two plate, two merchant and nine pipe mills together with its rod, wire and bessemer departments at its Youngstown holdings and three of its four pipe mills at Zanesville, O. The Republic Iron & Steel Co. has six finishing, six pipe and a plate mill engaged. Thirty-one hot tin mills are scheduled at the Trumbull Steel Co. together with its hot and cold strip departments. The Falcon Steel Co. is operaing four hot tin mills at Canton, O.

Williams Foundry & Machine Co., Akron, O., has increased its capital stock from $1000 to $500,000.

Sheet Prices Reaffirmed

Leading Maker Continues Present Quotations for Second Quarter—Large Tonnages Closed, but Valley Mills Could Handle More

SHEET PRICES, PAGE 517

Pittsburgh, Feb. 19.—Effective today the American Sheet & Tin Plate Co. reaffirmed its sheet prices for the second quarter at 3.00c, 3.85c, 5.00c and 5.35c, base Pittsburgh, for blue annealed, black, galvanized and full finished automobile sheets, respectively, making no change in the base prices or differentials. Large producers of sheets note a steady trend for improvement in the buying rate. Practically no consuming lines are below a normal rate of consumption, many being ahead, purchasing at an abnormal rate for this season of the year. Sheets in large tonnages are being bought for the accumulation of stock in anticipation of heavy building programs next spring and summer by the metal lath and other manufacturing trades. Catering to that class in many parts of the country these programs are well under way; in some last year's heavy building programs never have ceased and still are in force. Stove and range boiler manufacturers are buying, and automotive sheets are in heavy demand. Numerous automobile companies are placing orders practically each day. Some automobile sheet contracts for the first quarter already have been overspecified in excess of 10 per cent. Each specification is being charged against memorandum contracts arranged, until additional formal contracts can be written. Many automobile companies already are operating on the basis of 95 per cent or better. Having only 20 or 30 days' stocks ahead they keep ordering from day to day as their sheet needs arise.

Large Tonnages Closed

Philadelphia, Feb. 19.—More sheet business was closed here in the past week than for some time. This involved mainly contracts for delivery during the remainder of the first half. While forward buying is not yet general it is on a larger scale than at any time since third quarter contracts were placed last year. The leading interest's announcement of unchanged prices for the second quarter has not yet affected the general market. Galvanized sheets continue quotable at 5.00c, Pittsburgh, with a continuance of sales at 4.90c. Black sheets range from 3.70c to 3.85c. Blue annealed generally is 3.00c, Pittsburgh.

Mills Working at Capacity

Chicago, Feb. 19.—Generally speaking, delivery of steel sheets at this time is limited only by the capacity of the mills. Specifications are coming in heavily and save for some occasional gaps, mill schedules for the first quarter are tight. The leading local maker will open second quarter books in about a week, and presumably will continue to quote 3.00c, Pittsburgh, for blue annealed, 3.85c for black and 5.00c for galvanized.

More Tonnage Needed

Youngstown, O., Feb. 19.—Some sheet producers last week booked orders in excess of production, particularly those with mills scheduled on specialty stock. Other makers experienced a decline in tonnage entries compared with production schedules. The decline is not sufficient to change the optimistic views of producers, and will exert little influence on operating rates. However, it is felt there will have to be more activity in the market and a decided change in the sentiment of some of the smaller users before the second quarter can be viewed with confidence. The industry here is operating on an 80 per cent basis, with sufficient business in hand to maintain this rate for at least three weeks. The market is slightly disturbed by the comparative ease in which consumers are able to line up single pickled stock at 3.75c, Pittsburgh. Meanwhile, specifications are being issued in sufficient volume to schedule mills a week to 10 days ahead. Blue annealed is in good buying demand, especially for barrel fabricators. Certain grades of sheet mill by-products such as 22-gage galvanized seconds, which ordinarily are plentiful, now are difficult to locate and as a result prices have strengthened. Galvanized primes have not receded from the full price of 5.00c, base Pittsburgh, and are not likely to be moved at a lower price in view of the narrow spread between this and the black grade, based on the present price of spelter. Blue annealed is quotable at 3.00c, black at 3.75c to 3.85c and galvanized at 5.00c, base, Pittsburgh. The majority of the mills are in a position to entertain business for delivery during the first and second weeks in March. Producers of high grade stock are receiving specifications in larger volume and have expanded mill rollings accordingly. Consumers of fine finished sheets, especially in the automotive industry, are placing tonnage cautiously until they can determine future production schedules.

Fluorspar Still Sells

New York, Feb. 19.—Good business continues to be entered by importers of fluorspar. The price on 85 and 5 per cent grade continues $15 to $15.50 c.i.f. tidewater, per gross ton. Sales are restricted principally to tidewater points and foreign material is not able to move far inland in competition with domestic fluorspar.

Manganese Ore Closed

New York, Feb. 19.—A large tonnage of Caucasian manganese ore has been sold during the past week for early shipment. The grade involved is washed ore containing 53 to 55 per cent manganese. Asking prices on Caucasian ore now are 45 cents per unit, c.i.f. tidewater, for the washed grade and 42 cents for the ordinary grade, containing 48 to 49 per cent. A sale of 1500 tons of Indian manganese ore has been made at 44 cents per unit, c.i.f. tidewater for April and May shipment from India.

Employment in manufacturing plants in New York state declined about 1 per cent in January, as compared with January, 1923.

Structural Buying Gains

Philadelphia Insurance Building Takes 7000 Tons—Approximately 30,000 Tons at Closing Point in Chicago Alone—January Bookings Drop

STRUCTURAL SHAPE PRICES, PAGE 517

Washington, Feb. 19.—January sales of structural steel, totaling 161,416 tons, registered a drop of 20,013 tons from the December bookings, according to reports of the department of commerce. January was the largest month excepting December, since April. Shop activity was at 72 per cent of capacity in January as compared with 80 per cent in December and 54 per cent in November. January sales were reported by 149 companies with a capacity of 223,977 tons as compared with Decembers' returns by 163 companies with 232,757 tons capacity. Bookings in January were above the 1923 monthly average of 64.2 per cent of capacity for 1923 operation and 151,612 tons bookings. Shipments in January totaled 163,800 tons or 63 per cent of capacity as compared with 171,600 tons in December and 66 per cent and 179,400 tons in November and 69 per cent.

For comparative purposes the figures below are prorated to obtain the estimated total for the United States of a capacity of 250,000 tons per month. The figures represent the tonnage booked each month by 177 identical companies, six of which are now out of business, with a capacity for 1923 of 234,057 tons per month.

	Actual bookings tons	Per cent of capacity	Estimated total bookings
1922 total	1,690,566		1,921,250
1922 mo. aver.	140,881	64	160,104
January, 1923.	173,668	73	189,800
February	185,283	78	202,800
March	220,832	93	241,800
April	186,779	79	205,400
May	132,441	56	145,600
June	118,708	50	130,000
July	118,032	50	130,000
August	135,530	57	148,200
September ...	122,083	52	135,200
October	112,792*	48	124,800
November	125,761**	54	140,400
December ...	187,429***	80	208,000
1923 total....	1,819,338		2,002,000
1923 mo. aver.	151,612	64.2	166,833
January	161,416****	72	187,200

For first four months of 1922 figures of Bridge Builders and Structural society revised on basis of 250,000 tons capacity.

*Reported by 174 firms with a capacity of 235,007 tons. **Reported by 168 firms with a capacity of 233,882 tons. ***Reported by 163 firms with a capacity of 232,757 tons. ****Reported by 149 firms with a capacity of 223,977 tons.

Heavy Tonnage Being Figured

Boston, Feb. 19.—Some 5000 tons of structural steel in New England is actively before the trade and is expected to be closed within the next few days. Fabricators have been heavy buyers of shapes for stock during the past week and leading steel interests report sales in February to date fully 25 per cent above those for the same period in January. Prices are well stabilized at 2.40c, Pittsburgh. The 2.35c, Pittsburgh, quotations practically have disappeared.

Activity Quieter in East

New York, Feb. 19.—Structural activity the past week has been rather quiet, with few large orders in this immediate territory. Considerable work is still under contemplation but with prices relatively steady, builders for the present at least are moving more deliberately. The shape market may be quoted at 2.40c to 2.50c, Pittsburgh.

Fully 5000 tons of foreign structural steel has been sold in this district during the past week. The principal item was shapes, which went at around $42, duty paid, tidewater, equivalent to 2.10c.

Foreign Steel Again Bought

Philadelphia, Feb. 19.—Eastern structural shape mills are operating at from 80 to 90 per cent of capacity. New business is coming in as fast as shipments in most cases. The general market quotation continues to range between 2.30c to 2.40c, Pittsburgh. Additional sales of at least 2000 tons of foreign steel were made last week. This involved both shapes and bars. Prices on foreign steel averaged around 2.00c, delivered, duty paid tidewater consuming points, with the full range from 1.90c to 2.10c.

Little Tonnage Being Placed

Cleveland, Feb. 19.—Awards of structural shapes in this district continue to be confined mainly to small tonnage lots. The largest award during the past week was 6500 tons for Louisville & Nashville railroad bridgework at New Orleans to American Bridge Co. Several other awards were made in the district including 450 tons for the Security Trust Co., Detroit, to Fort Pitt Bridge Works. Two 14-story buildings at Huntington, W. Va., are expected to take about 2500 tons in the aggregate. Several thousand tons was distributed to northern Ohio fabricators during the past week. Deliveries by smaller mills are more extended, with some shops being booked ahead for 8 to 10 weeks. Lots of 100 tons or less when attractive can be delivered in three or four weeks by the larger mills. Prices on plain material are firm at 2.50c, Pittsburgh.

Fabricators Are Well Booked

Cincinnati, Feb. 19.—Most structural shape fabricators in this vicinity are able to report a collection of small orders all involving amounts below 100 tons each. Inquiries of the same character are numerous and buyers are closing promptly instead of waiting a week, two weeks, or more as they were doing previously. Occasionally a comparatively large tonnage finds its way to the order books. The most important award last week was of 6500 tons for bridgework purposes of the Louisville & Nashville railroad at New Orleans, which went to the American Bridge Co. The Indiana State Fair Grounds job, involving approximately 1000 tons went to the Insley Mfg. Co. Plain material is quoted at 2.40c to 2.50c, base Pittsburgh, although some of the bids encountered would indicate lower prices for steel or else a setting aside of profits.

Market Seems Opening Up

Chicago, Feb. 19.—Construction work that has been on architects' boards is being translated quickly into orders on fabricators' books. The Morava Construction Co. has booked a total of 3700 tons for one theater and one club building. The Wisconsin Bridge & Iron Co. appears low on 8100 tons of shapes in the Snelling-Mendota bridge at Minneapolis. The Soo Line proposes to extend an ore dock at Asland, Wis.; this job will take 5000 tons of steel or 1500 tons, according to a decision to use all steel or part concrete. The Santa Fe railroad is having plans made for a bridge over the Mississippi river at Fort Madison, Iowa, and the Canadian river, in Texas. Although the report has been current for a week that the American Bridge Co. was to be awarded the 15,000 to 17,000 tons of steel in the new Palmer House, Chicago, the Geo. A. Fuller Co. is now taking bids closing on March 12; heretofore it has been understood that Starrett Bros. had the general contract without competitive bidding. It is reported that the Stevens hotel, a project calling for upwards of 10,000 tons of steel, is alive again. Some good-sized sales of structural material for stock are reported, one approximating 1200 tons. The plain material price is 2.60c, Chicago.

STRUCTURAL CONTRACTS PLACED

Building awards this week ..... 28,535 tons
Building awards last week ..... 25,881 tons
Building awards two weeks ago .. 23,894 tons

7000 tons, building for Insurance Company of North America, Philadelphia, to McClintic-Marshall Co.

6500 tons, bridgework for Louisville & Nashville railroad at New Orleans, to American Bridge Co.

2700 tons, theater for Balaban & Katz, Chicago, to Morava Construction Co.

2000 tons, mercantile building for Sibley, Lindsay & Curr, department store, Rochester, N. Y., reported awarded to Phoenix Bridge Co.

1300 tons, Albany garage, Albany, N. Y., reported in a recent issue as placed, to Levering & Garrigues Co.

1200 tons, building for Buckeye Steel Castings Co., Columbus, O., to Mt. Vernon Bridge Co.

1150 tons, bridgework for Delaware, Lackawanna & Western, distributed as follows: 450 tons to American Bridge Co., and 700 tons to Shoemaker Bridge Co., McClintic-Marshall Co., Bethlehem Steel Co. and Phoenix Bridge Co.

1000 tons, Chicago Riding Club Academy, Chicago, to Morava Construction Co.

1000 tons, Indiana State Fair grounds, Indianapolis, to Insley Mfg. Co.

800 tons, bridgework for New York Central System, 132nd street, Cleveland, to Mt. Vernon Bridge Co.

600 tons, loft, 46 West Twenty-ninth street, New York, to Harris Structural Steel Co.

500 tons, building for Louis Burke, Inc., Philadelphia, to McClintic-Marshall Co.

500 tons additional work for Birmingham, Ala., plant of the Southern Railroad, to Virginia Bridge & Iron Co.; this brings total tonnage placed for this project up to 4100 tons, all going to the Virginia company.

450 tons, bank building for Security Trust Co., Detroit, to Fort Pitt Bridge Works.

450 tons, Julius Tishman apartment, Seventy-second street, New York, to Bethlehem Fabricators, Inc.

400 tons, building for Elks Building Corp., West Eighty-sixth street, New York, to Bethlehem Fabricators, Inc.

370 tons, cattle barn for Ohio State university, Columbus, O., to International Derrick & Equipment Co.

350 tons, bank at Pottsville, Pa., to Eastern Steel Co.

300 tons, building on Penn avenue for Schenck China Co., Pittsburgh, to Jones & Laughlin Steel Corp.

300 tons, bridge for Delaware & Hudson railroad, to American Bridge Co.

300 tons, bridges for railroads in Cuba, to Phoenix Bridge Co.

275 tons, building for Crocker estate, San Francisco, to the California Steel Co.

165 tons, screening and sintering plant at Crosby, Minn., for Robt. M. Adams Co., to Lakeside Bridge Co.

160 tons, building for United States Gypsum

Co. at Plasterco, Va., to Pittsburgh Bridge & Iron Co.
140 tons, factory for Dreis & Krump Mfg. Co., Chicago, to New City Iron Works.
125 tons, substation for Pacific Gas & Electric Co., El Cerrito, Albany, Cal., to Moore Drydock Co.
100 tons, steel stack for Louisville Gas & Electric Co., Louisville, Ky., to Louisville Bridge Co.

STRUCTURAL CONTRACTS PENDING

8100 tons, Snelling-Mendota bridge, Minneapolis; Wisconsin Bridge & Iron Co., reported low bidder.
5500 tons, addition to East Pittsburgh plant of Westinghouse Electric & Mfg. Co.; bids asked.
2600 tons, school No. 77, Bronx, and No. 215, Brooklyn, N. Y.; general contractors' bids close March 7.
2000 tons, Bricken loft building, Thirty-seventh street, New York; pending.
2000 tons, Seagate hotel, Seagate, L. I.; Tenential Corp., Fifth avenue, New York, general contractor.
2000 tons, two Minskoff apartments, Eighty-ninth and Ninetieth streets along Amsterdam avenue, New York; pending.
1500 tons, 14-story building for Cole Exchange, Huntington, W. Va.; pending.
1500 tons, 14-story bank building for Union Bank & Trust Co., Huntington, W. Va.; pending.
1500 to 5000 tons, ore dock extension at Ashland, Wis., for Soo Line railroad; proposed for construction.
1500 to 1800 tons, building for the knit goods trade, Worth street and Broadway, New York; specifications expected out in about a month through Jardine, Hill & Murdock, architect.
1300 tons, school No. 212, Brooklyn, N. Y.; general contractors' bids close March 11.
1125 tons, warehouse and garage for Bamberger & Sons, Newark, N. J.; pending. Reinforcing bars also will be required for this project.
900 tons, Niagara, Lockport & Ontario Power Co. towers; bids being taken.
765 tons, girder and I-beam spans for the Chicago, Burlington & Quincy railroad; bids in.
700 tons, state highway bridge, Maine, bids close around the middle of March.
700 tons, Seglin loft building, West Thirty-eighth street, New York; pending.
600 tons, addition to St. Johns hospital, Brooklyn, N. Y.; pending.
600 tons, building for Merchants Refrigerator Co., New York; pending
600 tons, Stockton Savings & Commercial Bank building, Stockton, Cal.; bids in.
600 tons, Michigan Central grade crossing elimination at Springwells, Mich.; bids in.
500 tons, plant in Philadelphia; fabricators submitting bids to general contractors.
500 tons, power plant addition for Public Service Corp., Marion, N. J.; pending.
500 tons, municipal museum, Newark, N. J.; pending.
300 tons, National Bank building, Phoenixville, Pa.; pending.
300 tons, apartment building at Eighty-ninth street and West End avenue, New York; pending.
300 tons, school at Harrison, N. Y.; pending.
300 tons, building for girls' school, Weston, Mass.; pending.
250 tons, Stanley building, Erie, Pa., pending.
200 tons, hotel at Eddy and Jones streets, San Francisco; bids being received.
200 tons, service building for Memorial hospital, Niagara Falls, N. Y.; bids in.
200 tons, plant addition for American Woolen Mills, Lawrence, Mass.; pending.
200 tons, Maple avenue school, Newark, N. J.; pending.
130 tons, laundry on 134th street and Southern boulevard, New York; pending.
100 tons, school at Mamaroneck, L. I.; pending.
90 to 100 tons, manufacturing plant for C. & G. Cooper Co., Mt. Vernon, O.; H. K. Ferguson Co., Cleveland, general contractor.

Ending Basing Case Soon

Washington, Feb. 19.—Announcement is made by the federal trade commission that March 5 has been fixed for sur-rebuttal evidence by the United States Steel Corp. before Examiner J. W. Bennett in Washington in the Pittsburgh basing point case. This testimony is expected to conclude evidence in the case and will be completed in three or four days. Arguments are set for June 9.

More Car Orders Placed

New York Central Awards 8000 and Is To Buy 9000 More—Pennsylvania Comes Out for 12,000—Locomotive Inquiries Heavier

RAILROAD TRACK MATERIAL PRICES, PAGE 517

New York, Feb. 19.—Locomotive buying has taken a decided spurt with inquiries in the market for over 125. The New York Central is inquiring for at least 50 while the Atlantic Coast Line and Nickel Plate are in the market for 20 each. The Union Pacific has entered the market for 25 locomotives while various other roads are scheduled to buy from one to eight each. The American Locomotive Co. booked 10 locomotives last week, eight of which were for a Brazilian road. The Great Northern railroad has placed six locomotives with the Baldwin Locomotive Works.

The Illinois Steel Co. has booked 3000 tons of rails for the United Railways. Rail mills are booked full for what they can handle until about August.

New York Central has awarded 8000 cars to Standard Steel Car Co. and American Car & Foundry Co.; of 17,000 contemplated, at least 10,000 are expected to be placed shortly. Louisville & Nashville is inquiring for 4000 cars and the Southern railroad for 1750 gondolas and 750 hopper cars.

Accessory Buying Heavier

Boston, Feb. 19.—Both street railroads and steam roads have been active in frog and switch buying recently. One street railroad system has placed orders for material totaling over $125,000. The Maine Central and the Boston & Maine both have specifications out covering frog and switch material. Buying of miscellaneous fastenings and bolts and nuts shows an improvement. Some car buying has taken place.

Norfolk Places 2000 More Cars

Philadelphia, Feb. 19.—The Norfolk & Western has placed an additional 2000 hopper cars, dividing the order between the Bethlehem Steel Co., Cambria plant, and the Standard Steel Car Co. requiring about 40,000 tons of steel. Reading is inquiring for 2000 hoppers and the Pennsylvania is expected to act soon on its car requirements. While no definite figures are known as to the contemplated purchases of this latter road, about 15,000 cars are understood as being sought. The Pennsylvania is reported as having placed a quantity of tie plates, the definite tonnage on which is not known, although its inquiry was for from 200,000 to 500,000 plates.

Issues Locomotive Inquiry

Cleveland, Feb. 19.—An inquiry for 10 switchers and 10 Mikado type locomotives has been issued by the Nickel Plate railroad. The Great Northern railroad has placed an order for six locomotives with the Baldwin Locomotive Works.

Pennsylvania Inquiry Out

Chicago, Feb. 19.—Local freight car builders are protecting themselves on material for 8000 box, 3000 automobile and 1000 stock cars which Pennsylvania may place shortly. The Missouri Pacific railroad has come into the market for 1000 automobile cars. The Santa Fe railroad has placed 200 box, automobile and gondola cars, leaving 1200 cars still outstanding. The Pullman Co. is starting to build 10,000 steel closed auto bodies for the Moon Motor Car Co., St. Louis.

The railroads having been heavy buyers of rails and track fastenings in recent months, new business necessarily is light. The Nickel Plate railroad is inquiring for 4000 tons of tie plates. One maker has taken 2000 tons of tie plates, 3000 kegs of spikes and 1400 kegs of bolts in the past week. A maker of steel rails will add 20,000 tons to its commitments in the next few days.

Wabash railroad has placed 2500 tons of tie plates in the Chicago district.

CAR ORDERS PLACED

Canadian National Railways, 24 passenger cars to Canadian Car & Foundry Co. and 11 baggage and baggage smoking cars to National Steel Car Corp.
Atchison, Topeka & Santa Fe railroad, reported last week as placed, allocated as follows: 1000 box and 500 automobile cars to The Pullman Co., 500 gondolas to American Car & Foundry Co.; 500 flat, 500 automobile and 500 stock cars reported placed.
New York Central, 500 automobile cars for Cincinnati Northern railroad, to American Car & Foundry Co.
Nashville, Chattanooga & St. Louis railroad, 50 ballast cars to Tennessee Coal, Iron & Railroad Co.
John Morrell & Co., Omaha, 100 refrigerator cars, to American Car & Foundry Co.
Northern Pacific railroad, 200 ore cars, to Pressed Steel Car Co.
Atlanta Car & Chemical Co., Elizabeth, N. J., 20 tank cars, to American Car & Foundry Co.
El Paso & Southwestern, 400 box cars, to Standard Steel Car Co.
Norfolk & Western, 2000 additional 70-ton hopper cars, divided evenly between Cambria plant of Bethlehem Steel Co. and Standard Steel Car Co. This brings total placed in last two weeks up to 6000 cars.
New York Central, 8000 cars allocated to Standard Steel Car Co. and American Car & Foundry Co., of 17,000 contemplated.

CAR ORDERS PENDING

Missouri Pacific railroad, 1000 automobile cars; pending.
Nashville, Chattanooga & St. Louis railroad, four baggage and three passenger cars and one diner; pending.
Central of Georgia, repairs to 100 box cars; pending.
Denver, Rio Grande & Western, 500 automobile cars; pending.
New York Rapid Transit Corp., 148 underframes; pending.
Southern Pacific, 23 passenger cars; pending.
Pennsylvania railroad, 8000 box, 3000 automobile and 1000 stock cars; actively being figured.
Philadelphia & Reading, 2000 hopper cars; pending.
Southern Railroad, 1250 gondolas and 750 hopper cars; pending.
Louisville & Nashville railroad; 4000 cars; pending.

Succeeds Milwaukee Mill

Chicago, Feb. 19.—To conform with Wisconsin laws, the Inland Steel Co. of Wisconsin has been incorporated as the successor to the Milwaukee Rolling Mill Co. P. D. Block is chairman of the company. C. A. Irwin, who was president of the Milwaukee company, continues in that capacity for the new company. E. M. Adams and C. M. Easterly are vice presidents, and W. B. Truesdale is secretary and treasurer. All sales are now being directed from the Chicago office of the Inland Steel Co.

The Nonferrous Metals

Prices Go Up Rapidly and Copper Takes Products Along—Tin Loses Part of Extreme Rise

	Copper Electro delivered	Copper Lake delivered	Spot Straits New York basis	†Lead New York basis	Zinc St. Louis basis	Spot† aluminum	Spot antimony	Nickel spot
Feb. 13	12.75	13.00	53.50	9.00	6.75	27.00	10.50	29.00
Feb. 14	13.00	13.25	55.00	9.12½	6.77½	27.00	10.75	29.00
Feb. 15	13.12½	13.37½	54.50	9.25	6.87½	27.00	11.00	29.00
Feb. 18	13.50	13.62½	55.25	9.25	6.97½	27.00	11.25	29.00
Feb. 19	13.50	13.62½	54.00	9.25	6.92½	27.00	11.12½	29.00

†Outside market quotation.

NEW YORK, Feb. 19.—Strong and active markets have prevailed in all the important nonferrous metals this week.

Lead has advanced to the highest levels since 1920 at 9.25c, New York, 9c to 9.12½c, East St. Louis, in the outside market, for February and March shipment. The American Smelting & Refining Co. advanced its official contract price to 8.50c, New York. Expanding foreign consumption and broad American consumption are responsible for the market strength.

Copper has advanced to the highest levels since the end of September, excepting for two days in November. The progress being made politically abroad, accompanied by expanding European industrial requirements, is creating a strong European demand for copper. Domestic consumption continues at close to the peak of manufacturing facilities, so that only a slight improvement in the foreign absorption has sufficed to turn the market upward. The price of copper advanced 1 cent a pound the first two weeks of February to 13.50c, delivered. All allied lines have advanced. Rolled and drawn products rose ½ cent a pound and wire ¾ cent. Scrap is up ½ cent. Casting and composition ingot accordingly are higher. Lake copper advanced to 13.62½c as of Feb. 18.

The zinc market has been strong and active. Domestic galvanizers have bought heavily this month for March and April shipment and export buyers have been bidding actively for supplies of American zinc. Prices in London rose £2 in a week, following our market upward. Reduction of retorts in operation by 7500 in January has served to indicate a drastic cut in production, caused by the lack of profit in recent zinc prices.

The tin market has been exceptionally strong, but broke more than 1 cent today. Spot tin has been in larger supply and the premium on spot has narrowed down. The real interest is in futures, which are being bought actively by professional operators; some prominent figures in the world tin trade are enthusiastic bulls, predicting a long time bull swing to the highest levels ever recorded for tin. Spot tin sold up to 55.50c on Feb. 18; futures sold at the equivalent of 55c. The price of 99 per cent tin is about ¾ cent under Straits.

Sales of 98 to 99 per cent virgin ingot aluminum have been made in the ouside market at 27c; of 99 per cent at 28c. The domestic producer is reported to be taking most of the tonnage business offering at its regular quotations of 26c and 27c, respectively.

The antimony market advanced ½ cent to 11.25c, duty paid, for spot. Futures are held above parity with the American spot price, excepting for occasional resale lots.

Mill Products

Base prices cents per pound, f.o.b. mill

SHEETS	
Copper, hot rolled, 4 oz., min.	21.00
High brass	17.75
Zinc, ga. 9 to 18 (plates ½c less)	9.75
Lead, full sheets (cut ¼c more)	12.25
Aluminum, base 18 ga. and up	36.40
SEAMLESS TUBES	
High brass	22.00
Copper	23.00
RODS	
High brass, round, ⅝ to 2½-inch	15.50
Naval brass rods	18.25
WIRE	
Copper	15.50 to 15.87½
High brass	18.25

Old Metals

Dealers' buying prices cents per pound

HEAVY RED BRASS	
Cleveland	9.50
New York	8.50 to 8.75
Chicago	9.00
HEAVY YELLOW BRASS	
New York	5.75 to 6.25
Chicago	7.00
Cleveland	6.50
ZINC	
New York	4.00 to 4.50
Cleveland	4.25
Chicago, dross	4.75
HEAVY COPPER AND WIRE	
Cleveland	11.00
New York	10.25 to 10.75
Chicago	10.50 to 10.75
RED BRASS TURNINGS	
New York	7.50 to 7.75
Cleveland	8.50
Chicago	8.25 to 8.50
YELLOW BRASS TUBING	
Cleveland	6.00
NO. 1 BRASS ROD TURNINGS	
Cleveland	6.25
New York	6.50 to 6.75
Chicago	6.75
ALUMINUM BORINGS	
Cleveland	12.50

Empire Works To Resume

The Waddell Steel Co., Niles, O., which recently acquired the Empire works, including eight hot and three cold sheet mills, from the Youngstown Sheet & Tube Co., expects to start operations during the early part of March.

To Erect New Foundry

Pittsburgh, Feb. 19.—Westinghouse Air Brake Co. plans immediate construction of a $1,500,000 plant, according to recent announcement by G. W. Wildin. The new building will be 915 feet long, 3-story, brick and steel construction. Half of the plant will be used for foundry purposes and will open into the present No. 3 foundry building. The remaining portion of the plant, 450 feet in length, will be used as a machine shop and will house the punch work and screw machine departments. The third floor of this section will be converted into a department for the manufacture of automatic train control equipment.

By-Products Steady

Japanese Inquiry for Ammonium-Sulphate—Prices are Untested

New York, Feb. 19.—A fair size Japanese inquiry features an otherwise quiet market in sulphate of ammonia. With the loan to that country receiving such favorable reception a marked improvement in Japanese buying within the next couple of months is expected. Domestic inquiry is practically at a standstill, with little probability of a revival before May, at which time fertilizer interests usually come in for their annual requirements.

Prices are nominally unchanged at $2.70 to $2.75, works, on material for domestic account, and $2.75 to $2.80, port, on material in double bags for foreign shipment. This steadiness may be attributed in part to the fact the market has not been tested, but the principal reason is that annual contracts are consuming by far the greater portion of current production.

Conditions in the light oil distillates market are virtually unchanged, with supplies rather scarce and prices strong. Pure benzol may be quoted at 25 cents, works, in tanks and 30 cents in drums; 90 per cent benzol, 23 cents in tanks and 28 cents in drums; solvent naptha, 25 cents in tanks and 30 cents in drums, toluol, 26 cents in tanks and 31 cents in drums and xylol, 29 cents, works, in tanks and 34 cents in drums. Prices on the latter product now appear uniform throughout the trade.

Contract phenol continues to be placed around 26 cents to 27 cents, works. Spot material, however, which is chiefly in the hands of resellers, is several points higher. Naphthalene appears slightly easier, flakes now holding at 6 cents and balls at 7 cents works.

Coke Oven By-Products

Spot*

Per Gallon at Producers' Plants in Tank Lots	
Pure benzol	0.25
Toluol	0.26
Solvent naphtra	0.25
Commercial xylol	0.27 to 0.29
Per Pound at Producers' Plants	
Phenol	0.27
Naphthalene flake	0.06½
Naphthalene balls	0.07½
Per 100 Pounds at Producers' Plants	
Sulphate of ammonia	$2.70 to $2.75
Contract	
Pure benzol	Nominal
Toluol	Nominal
Solvent naphtha	Nominal
Commercial xylol	Nominal
Per Pound at Producers' Plants	
Phenol	$0.2[illegible]
Naphthalene flake	0.06
Naphthalene balls	0.07

*Spot distillates are subject to shading.

Coast Buying Increases

Aggregate of Small Lots in All Lines Gives Volume—Plates Most Active of Finished Steel Lines—Track Supplies Pending

SAN FRANCISCO, Feb. 14.—Trading in iron and steel products is increasing and although large tonnages are lacking a satisfactory volume of business is being booked in small lots. Prospects for some heavy buying are bright and prices are tending upwards, though the rivet and plate markets have developed some weakness.

Construction activity is being well sustained. Los Angeles reports that building permits issued in January totaled $13,158,526, compared with $11,258,517 for January 1923. The present month started off with a rush. To Feb. 5, 1956 permits were issued with a valuation of $3,920,088, compared with $1,832,751 for the corresponding period of January.

Pig Iron and Coke

Activity in pig iron and coke is lacking and sales involve small lots. The Southern Pacific Co. is asking for bids, to be opened Feb. 16, on 500 tons of No. 2 southern or Scotch material, silicon 2.25 to 2.75 to 2.75 to 3.25. In addition it will open bids on Feb. 23 for 500 tons of coke. This is the only inquiry of size before the trade this week. Prices on the Scotch material remaining unchanged at $30.50 c.i.f. duty paid San Francisco for large lots and from $33 to $34 for spot material. Continental iron is firming up and the low price of $26 two weeks ago has disappeared.

Bars, Plates and Shapes

New business in merchant steel bars is confined to small tonnages and local mills are meeting strong competition from foreign and eastern domestic operators. One interest this week reports receiving a foreign quotation of 1.90c c.i.f. duty paid San Francisco. Local mills are naming 2.90c f.o.b. San Francisco while eastern mills are quoting 2.85c c.i.f. coast ports. On the other hand the concrete bar market is improving. Practically no competition is met from foreign or eastern mills and as a result prices are about $12 a ton higher than for soft steel bars of merchant quality. Awards this week total over 800 tons while some 2500 tons are pending in addition to a large volume of business involving from 20 to 60 tons.

Inquiries for large lots of plates are few but a satisfactory volume is being booked in smaller tonnages. Two companies report the total booked during the past 20 days was larger than for any similar period in 1923. New bids are being asked on the Santa Cruz pipe line involving 600 tons. Prices have not firmed up and 2.25c c.i.f. coast ports represents the general run. Some business has been taken at 2.90c and on desirable lots 2.80c is being quoted.

Trading in structural steel during the past week was restricted to small lots, only one award of over 100 tons being placed. The volume of small work being booked and up for figures aggregates a fair tonnage. Several larger projects are pending. Prices are holding firm at 2.85c c.i.f. coast ports, with some business bringing 2.90c.

Other Finished Material

A better volume of sheet business is coming into the hands of mill representatives in this district, although buying in large lots is not being done. Demand for sheets in the Los Angeles district is much better than in this section or in the Northwest. One interest reports booking over 1000 tons during the past week, all in relatively small lots. Prices appear to be firm at 5.00c base Pittsburgh for No. 28 galvanized sheets.

Only one award of cast iron pipe was made this week, Alhambra, Cal., placing 321 tons with the Pacific Pipe & Supply Co. for French made pipe. English manufacturers have entered this field now and last week quoted on a lot for Pasadena. Over 12,000 tons are up for figures or pending.

The Key System, Oakland, Cal., has placed 1000 tons of girder rails with the United States Steel Products Co. No action has been taken by the Western Pacific on its inquiry for 7780 kegs of track spikes and 1127 kegs of track bolts or by the Southern Pacific on its inquiry for 3000 kegs of track spikes and 500 kegs of track bolts.

Warehouse Material

Distributors report sales for the first 12 days of February exceptionally good for this time of the year but during the past two or three days movement of out-of-stock material has decreased. All lines are active, with nails and wire products and pipe being most in demand. Demand is coming from practically all sources. No changes have occurred recently in out-of-stock prices.

Ship Less Locomotives

Washington, Feb. 19.—Shipments of locomotives in January totaling 151 were less than half of those of December when deliveries amounted to 329. Of the January figure, 147 were for domestic use and four for foreign. Unfilled orders at the end of January dropped orders when domestic business on books totaled 344 and and foreign 32, as compared with 365 domestic and 22 foreign in December.

Northwest Feels Impetus

SEATTLE, Feb. 13.—The turnover of iron and steel products is well sustained and business conditions are satisfactory. Demand has increased and within a month the spring movement is expected to be at its height.

Construction continues active and building shows no cessation. The week's announcements include a $115,000 fireproof fruit storage building for the Northern Pacific railroad while the Union Oil Co. will spend $500,000 in the state this year for 18 new storage plants and 40 service stations.

The Boeing Air Plane Co., Seattle, has obtained a $500,000 contract from the navy department for the construction of 50 seaplanes to be delivered this year. The Union Bridge Co. has been awarded the contract to complete the Fallon bridge in Benton county at a cost of $49,000. The same company will also furnish two 50-foot steel bridges in Kititas county.

Finished Materials

Business is expanding, practically everything being in good demand, with bolts, rivets and sheets leading. Jobbers have much stock en route from eastern centers and an active spring turnover is anticipated.

Pig Iron and Coke

The market for pig iron continues strong although little change is noted from a week ago. Consumers are buying for second quarter as their needs require, local houses having sold several hundred tons of best grade British and Scotch iron the last few days. Prices are firm at about $33.50 and $34 for No. 1. Domestic iron is out of the question due to high freights while the trade is not much interested in offers of Chinese iron. Coke remains unchanged with about the usual volume being handled.

Bars, Plates and Shapes

The week's feature is a cut rate war on these items affecting Portland only. One outside dealer in that city who is reported to have about 3000 tons of stock on hand, principally bars, announced a price of 3.00c. This was immediately met by other dealers who had been maintaining 3.75c. Inasmuch as the cost of these items is 2.85c the situation is somewhat involved and it is expected prices will shortly return to normal. In the Seattle territory 3.75c is being maintained. Dealers report bars, plates and shapes moving in satisfactory volume. Lighter shapes and plates are in better demand, considerable light tank work calling for plates. Bars are steady and the tone is healthy. The local steel mill is operating as usual with considerable work on books. No foreign demand for bars is reported.

Old Materials

There is a trifle better tone to the scrap market, attributed to conditions in eastern centers. The local mill is quoting $10.50 gross for ordinary grades of steel with premiums for better grades. Demand is a trifle better. Considerable battleship scrap is being distributed in the California market but none of it is offered here. The cast iron market is somewhat more settled and prices firmer, average prices for No. 1 cast ranging from $18 to $19. This material is scarce but sufficient for present demands.

Japanese Purchases

May Involve 1,000,000 Tons of Steel, With Proceeds of Loan

Washington, Feb. 19.—Reports reaching here that the recent $150,000,000 loan to the Japanese government placed in this country will release a demand for the purchase of the estimated total of 1,000,000 tons of steel in the United States soon cannot be substantiated by any tangible information received by government department in Washington. Officials believe that any speculation as to probable tonnages to be placed in the United States by Japan is based on guesswork, as a number of factors would enter in a program of buying now, which might affect the amount to be bought and the time over which these purchases would extend.

That Japan will use a large part of the proceeds of this loan for the buying of steel and lumber products in this country seems certain, but as a loan also was made in England it is believed likely that some orders for building materials likewise will go to British producers. The recent abolition of the reconstruction board and the transfer of its functions to the Japanese home department has cast some uncertainty over probable purchases by the Japanese government, although private corporations in Japan apparently will get started on their reconstruction plans as early as possible. Considerable reconstruction already is under way. On March 31 a new tariff policy also may be put in force on imports into Japan, which might effect foreign purchases. After the earthquake, import restrictions were lifted until March 31.

It seems reasonable to suppose that Japan's largest needs in the way of for ign steel will be in structural shapes. The earthquake disaster changed the status of structural needs in Japan. Prior to the earthquake, the saturation point apparently had been reached in building construction and the buying of plain structural material and fabricated shapes from sources outside of Japan had not been large. As its home mills are not equipped to roll structural shapes, especially certain sections, it seems reasonable that Japan will look to other countries for much of its structural needs. The Imperial Steel Works perhaps is equipped to turn out structural material but has been doing little of this.

Rush deliveries of black and galvanized sheets and nails were made to Japan in November for Japanese private account and more were delivered in December. While the purchase prices of these products were not announced, it is said that the buying of such large tonnages as reported would use perhaps $100,000,000 of the recent loan. The total amount to be spent by Japan in reconstruction work in the next five fiscal years is 468,438,849 yen ($350,000,000). The permanent reconstruction program is expected get under way at the beginning of the Japanese fiscal year, April 1.

Urges Wisconsin Steel Co. Be Divorced

Chicago, Feb. 19.—Relation of the Wisconsin Steel Co. to other components of the International Harvester Co. as now constituted has not yet received major attention in the hearings the department of justice is conducting as the sequel to the demand of the federal trade commission that the Harvester antitrust action be reopened.

The consent decree entered into by the Harvester company and the government during the war period left the door slightly ajar. Nearly two years ago the trade commission recommended that the case be reopened, the Harvester organization be further dismembered, and the Wisconsin Steel Co. be completely divorced. A few months ago the department of justice initiated an inquiry to ascertain the worth of the trade commission's recommendation.

Ten days ago the department of justice at St. Paul completed the taking of testimony against the Harvester company as now constituted. At present the department's representative, A. A. Farrington, is hearing the defense of the Harvester company in Chicago. Most of the testimony so far has had to do wih prices and competition in the sale of farm implements.

President Views Business Outlook as Bright

Washington, Feb. 19.—President Coolidge views the market for industrial products including steel, as being in a very comfortable position. The outlook is considered encouraging according to a statement from the White House today despite the fact that orders are not being booked very far ahead. Immediate business conditions are pronounced to be sound.

The cabinet today discussed the general business situation and found that steel and building conditions were encouraging. The circulation of political rumors was deplored.

Witherbee, Sherman & Co. blew out its small furnace at Port Henry, N. Y., for repairs, on Feb. 9.

Watch Sales of Foreign Steel Products

Washington, Feb. 19.—Recent sales of foreign pig iron and steel products in this country at $5 to $10 below the delivered prices of American materials have attracted considerable interest here but little definite information has been received as to the tonnage involved. Various estimates have been made as to imports, and efforts have been started to ascertain the true figures.

It is believed generally that American mills will be able to successfully meet this competition before it reaches large proportions. The naming of lower prices to meet the competition along the Atlantic seaboard is thought to be likely.

The duty on plain structural steel into this country is $4 a net ton.

Awarded Bessemer Medal

New York, Feb. 19.—Announcement has just been made that the Bessemer gold medal for 1924 has been awarded by the Iron and Steel institute, London, to Albert Sauveur, professor of metallurgy, Harvard university. Professor Sauveur is the sixth American to be honored by the institute and the first in 29 years, or since the medal was presented to Dr. Henry Marion Howe in 1895. The medal will be presented to Professor Sauveur at the May meeting of the Iron and Steel institute in London.

Mill Cinder Prices Up

Philadelphia, Feb. 19.—Mill cinder has been sold for first half at $3.35 to $3.85 delivered eastern Pennsylvania furnaces, about 25 cents higher than was quoted over the last half of 1923. Mill scale sold for $5.75 to $6.75 for first half, is an advance of about 50 cents over last half prices.

To Start Scrap Case

Washington, Feb. 19.—Taking of testimony will be begun at Phoenix, Ariz., March 5 on the complaint issued by the federal trade commission against the Steel Mill & Foundry Co. charging the latter as constituting a monopoly in the buying of scrap for various Pacific Coast steel producers.

Hot Mill Sets New Record

Youngstown, O., Feb. 19.—Trumbull Steel Co. broke its hot mill monthly production record in January when it produced 38,805 net tons of hot strip steel, sheets, and tin plate. The previous high mark was 38,238 tons.

Coke Production Scores a Gain in January

Washington, Feb. 19.—Reflecting increased production of iron and steel, the output of by-product coke during January showed an increase of 3.1 per cent over the month preceding, according to the geological survey. The total production was 3,094,000 net tons, the largest in any month since last October. The percentage of production to capacity was 82.8. Of 70 plants in existence, 65 were in operation and 5 were idle. The new plant of the Battle Creek Gas Co. with 11 Koppers ovens at Battle Creek, Mich., which had been fired up on the closing days of the old year, was in production. The production of beehive coke in January was also the largest since October. The total for the month is estimated from railroad shipments at 1,154,000 tons, an increase of 9 per cent over that of December. The comparative record follows:

Monthly Average	By-Product Coke	Beehive Coke	Total
1917	1,870,000	2,764,000	4,634,000
1918	2,166,000	2,540,000	4,706,000
1919	2,095,000	1,638,000	3,733,000
1920	2,565,000	1,748,000	4,313,000
1921	1,646,000	462,000	2,108,000
1922	2,379,000b	714,000b	3,093,000
1923	3,127,000	1,497,000	4.624,000
November, 1923	2,942,000	1,103,000	4,045,000
December, 1923	2,999,000	1,063,000	4,062,000
January, 1924	3,094,000	1,154,000	4,248,000

(a) Excludes screenings and breeze.
(b) Revised from last report.

The production of beehive coke increased slightly during the week ended Feb. 9. From reports of cars of beehive coke loaded by all the principal roads, the geological survey estimates the total output at 287,000 net tons, as against 264,000 tons in the preceding week. In spite of the increase the present rate of output is but 80 per cent of that a year ago, when the shortage of domestic anthracite created an additional demand for coke. The comparative weekly record follows:

	—Week Ended— Feb. 9 1924a	Feb. 2 1924b	Feb. 10 1923
Pennsylvania and Ohio	231,000	213,000	288,000
West Virginia	16,000	13,000	19,000
Alabama, Kentucky, Tennessee and Georgia	20,000	20,000	21,000
Virginia	11,000	9,000	17,000
Colorado and New Mexico	5,000	5,000	8,000
Washington and Utah	4,000	4,000	6,000
United States Total	287,000	264,000	359,000
Daily Average	48,000	44,000	60,000

(a) Subject to revision.
(b) Revised from last report.

The production of soft coal is well maintained, the total running about 11,500,000 tons weekly.

Enlarge Ashland Ore Dock

Ashland, Wis., Feb. 19.—The Soo Line iron ore dock at Ashland will be doubled in size and capacity, according to the railroad company's announcement. A 900-foot concrete extension will be added to the present concrete dock which is four years old. A contract has been awarded for the substructure. The extension will be completed early in 1925 and it is estimated the cost will be around $1,000,000.

Shipments of Manganese Ore Increased

Washington, Feb. 19.—Shipments of high grade manganese ore in the United States in 1923, according to preliminary figures compiled by the geological survey were approximately 32,000 gross tons, valued at $894,000, or about $28 a ton, compared with 13,404 gross tons in 1922, valued at $455,160, or about $34 a ton. The decrease in average value appears due chiefly to the fact that of the high grade ore shipped in 1923 a larger part contained only about 35 per cent of manganese, whereas most of that shipped in 1922 contained 45 to 53 per cent. Montana, as usual, shipped the largest quantity, about 22,000 tons.

Quarterly imports of manganese ore were as follows: First quarter, 17,445 tons; second quarter, 62,943 tons; third quarter, 82,025 tons; fourth quarter, 43,635 tons, a total of 206,048 tons, valued at $3,874,510, or an average of $18.80 a ton. These are the smallest imports since 1911 and are less than half those in 1918, when the domestic production was nearly 10 times as much as in 1923. In 1918 the production plus the imports amounted to 797,000 gross tons, compared with 238,000 tons in 1923. These figures do not indicate a decrease in the requirements for manganese, however. The conditions are due to the facts that imports of ferromanganese in 1923 were large and manganese ore had been imported and stocked at the furnaces in 1922, prior to the date the new tariff went into effect.

Shipments of lower grade ore in 1923 amounted to about 305,000 gross tons containing 10 to 35 per cent of manganese, valued at $1,110,000, and 855,000 tons containing 5 to 10 per cent of manganese which were valued at $2,760,000.

Government Continues to Ask for Statistics

Washington, Feb. 19.—An expression of policy by the department of commerce with regard to the publication of statistics gathered by trade associations is the first step in the determination of a future course since the letter of Attorney General Daugherty beclouded the issue of legality. An announcement made by the department Feb. 16 contains the followiing explanatory paragraphs bearing on the present situation:

"The department of commerce will convene to publish its monthly Survey of *Current Business* in connection with which it has been receiving information and statistics from various associations. For the purpose of this and other publications and the performance of other duties imposed upon it by law, the department will, from time to time, request associations to furnish it with such statistics as may be necessary or convenient for its purposes. The information which associations furnish will be used, within the limits of department appropriations and facilities, in the publications to the extent that is proves suitable.

"The department is not at present in a position to distribute the information received otherwise than through its publications. The department does not express any views as to the legal status of any association from which it receives the information, or any approval of its activities."

Richard Trimble Dies

Richard Trimble, formerly secretary and treasurer of the United States Steel Corp., and a well known figure in the steel industry until his retirement in 1922, died at his home in New York, Feb. 18, after a lingering illness. Mr. Trimble was born in New York in 1858 and was graduated from Harvard university in 1880, a classmate of Theodore Roosevelt, Robert Bacon and other men who later became distinguished in various walks of life. Following his graduation, Mr. Trimble went with Robert Bacon for a trip around the world. He then spent some years in the cattle business in Wyoming. He served as ensign in the United States navy during the Spanish-American war. Later he became treasurer of the Federal Steel Co. Mr. Trimble took an active part in the negotiations conducted by J. Pierpont Morgan which led to the formation of the United States Steel Corp. When the Steel corporation was formed, Mr. Trimble was elected secretary and treasurer and held that office until illness forced his retirement from active business.

Establishes Warehouse

The Hillside Fluor Spar Mines, 38 South Dearborn street, Chicago, has established a branch warehouse at Broadway and Fifteenth street, Cleveland. A stock of washed gravel and coarse ground fluor spar as well as iron foundry flux will be maintained for quick shipment to points within the district. The company maintains warehouses also in Chicago and St. Louis.

Strike Stops British Exports

Dockworkers' Walkout Diverts Business to Continent and United States—Japan Sending Sheet Orders to America—French and Belgian Makers Raise Prices—Ruhr Operations Becoming More Active

Iron Trade Review Staff Cable

European Headquarters,
IRON TRADE REVIEW,
2-3 Caxton House, Westminster, S. W.1

LONDON, Feb. 19.—The strike of dockworkers is stopping British foreign trade and if it is prolonged a large volume of business will be diverted to the Continent and to the United States. French and Belgian producers have advanced their export prices £1 ($4.29), steel beams selling at £6 7s 6d ($27.35), Antwerp. British mills lost orders for more than 50,000 tons the first day of the strike. It is understood here that Japan is diverting its orders for galvanized sheets to the United States.

The dock strike involves more than 100,000 men. The workers are asking for an advance of 2 shillings ($0.43) a day to recover the reduction to which they agreed in 1922. The majority of British workers were earning prior to the strike 10 to 13 shillings ($2.14 to $2.35) a day.

The recent railroad strike is estimated to have cost British industry $4,000,000 to $5,000,000. Labor troubles are assuming more importance than at any time since 1921. The coal miners have voted in favor of abrogating their agreement with the operators, and have served notice that the present wage agreement will terminate by final expiration on April 17.

In the steel market an inquiry has been received from San Francisco for 5000 tons of rerolling billets, on which £6 ($25.74), Antwerp, has been quoted. Scotch makers are asking £1 more. The freight to San Francisco is £1.

IRON TRADE REVIEW's correspondent at Dusseldorf reports increased activity, 33 blast furnace stacks and 74 open-hearths now operating in the Ruhr district.

French, Belgian and British railmakers will meet in Paris Saturday to discuss a proposal for the formation of a pool in which American and German producers may be invited to join. Sweden is inquiring for 11,000 tons of rails.

British iron and steel exports in January amounted to 338,000 tons including 9700 tons of pig iron shipped to the United States. Exports in December totaled 355,000 tons and the monthly average for 1923 was 366,000 tons. British iron and steel imports in January totaled 140,000 tons compared with 108,000 tons in December and a monthly average of 111,600 tons in 1923.

Only one change is noted in the list of British quotations this week, furnace coke for export being priced at £1 9s ($27.66) a reduction of 5 shillings ($1.07).

Sterling exchange is figured on a basis of $4.29.

Belgians Deliver Iron Below British Cost

European Staff Special

Office of IRON TRADE REVIEW,
Prince's Chambers, Corporation St.

Sterling—$4.28

BIRMINGHAM, Eng., Feb. 1.—The iron and steel trades are making slow recovery from the rail strike. The settlement came just in time to prevent general stoppage. A number of furnaces have not yet restarted and various large steelworks are idle awaiting fuel.

The principal trouble at the moment is not lack or orders, as good tonnages are on books. New business is slow in face of continental competition. Importations of pig iron are rare. But with the Belgian currency at 104 francs to the pound and the French at 92, continental furnaces have found it possible to ship iron into such important districts as Glasgow, underselling the Cleveland product by 15s ($3.21) to £1 ($4.28) per ton, and shipments have also been made to Cleveland steelworks, who can buy more profitably than they can produce at their own furnaces. Cleveland shipments of pig iron are understood to compare favorably during January with December, though statistics are not yet available. But these exports are on old orders, and new foreign business is almost unobtainable. Some continental iron is being sold in Birmingham at £5 ($21.40) delivered which gives an advantage of several shillings compared with Midland brands; but users in this area are shy of foreign qualities, in view of buying conditions and inability to reject material not up to requirement.

Cheap foreign steel is becoming more troublesome, low prices having been quoted this week. Joists have further reduced to £7 10s ($32.10) delivered, Birmingham, against the home price of £10 ($42.80). To meet export competition English makers have reduced export prices to £8 10s ($36.38). Finished bars are offered at £7 10s ($32.10) delivered here, a reduction of at least £1 10s ($6.42) below the British quotation. Mild steel billets are selling at £5 11s ($23.75) f.o.b. Antwerp and wire rods at £8 4s ($35.09). English makers are not attempting to meet these prices and associated houses are adhering to £8 10s ($36.38). But as some of the largest steelworks are outside the association and selling at £8 ($34.24) the higher figure must be reduced.

A marked revival has taken place in Staffordshire finished iron which is advancing.

The Welsh Tinplate & Sheet Manufacturers' association has published statistics showing total output of tin plates and black plates was 17,229,790 basis boxes against 14,802,525 boxes in 1922, and 6,467,211 in 1921. Of this manufacture it was estimated sales to home buyers amounted to 202,894 tons compared with 168,778 tons in 1922 and 87,174 tons in 1921. Last year's exports established a new record with 551,124 tons, the previous highest being in 1913 with 494,497 tons.

Belgian Steelmakers Find Improvement

European Staff Special

Franc—$0.04

BRUSSELS, Feb. 1.—The Belgian iron and steel market is beginning to show signs of improvement, but demand is not sufficient to absorb increasing production, and costs continue upward while competition is forcing prices down. Railroad congestion has delayed shipments and industrials in the Charleroi district are receiving only 60 per cent of needed cars. Lorraine and Luxemburg competition is beginning to subside. German competition is not dangerous.

Pig iron is being sold in Great Britain

Current Iron and Steel Prices of Europe

Last Reported Prices Converted into Dollars at Rates of Exchange, February 18

British Market

Corrected to Date by Cable
Home Market Prices. Gross Tons at Works or Furnace

	$	£ s d
SEMIFINISHED STEEL		
Billets, soft steel	31.11	7 5 0
Sheet bars	32.18	17 10 0
Wire rods	47.19	11 0 0
FINISHED STEEL		
Steel bars, England, ⅝ to 3-inch	40.76	9 10 0
Steel bars, England, ⅝ to 3-inch, for export	38.61	9 0 0
Plates, ship, bridge and tank, England	40.76	9 10 0
Plates, ship, bridge and tank, England, for export	38.61	9 0 0
Plates, ship, bridge and tank, Scotland	40.76	9 10 0
Plates, ship, bridge and tank, Scotland, for export	38.61	9 0 0
Beams, England	40.76	9 10 0
Beams, England, for export	38.61	9 0 0
Beams, Scotland	40.76	9 10 0
Beams, Scotland, for export	36.47	8 10 0
Sheets, black, 24 gage	57.92	13 10 0
Sheets, black, 24 gage, for export	55.77	13 0 0
Sheets, galvanized, 24 gage	78.30	18 5 0
Rails, 60 pounds and over	38.61	9 0 0
Rails, 60 pounds and over, for export	37.54	8 15 0
Tin plate, base box 108 pounds	5.15	1 4 0
Steel hoops	51.48	12 0 0
Steel hoops, for export	48.27	11 5 0
PIG IRON		
Hematite, East Coast, Mixed Numbers	21.66	5 1 0
Hematite, West Coast, Mixed Numbers	23.07	5 7 6
Basic, Middlesbrough	20.38	4 15 0
No. 3 Foundry, Middlesbrough	21.03	4 18 0
No. 3 Foundry, Derby, Leicester, Nottingham	20.38	4 15 0
No. 3 Foundry, Northamptonshire	19.84	4 12 6
No. 3 Foundry, Staffordshire	20.38	4 15 0
No. 3 Foundry, Scotch	22.53	5 5 0
Ferromanganese, 76 to 80 per cent	72.93	17 0 0
COKE		
Yorkshire furnace	5.80	1 7 0
Yorkshire furnace, for export	6.23	1 9 0
Foundry	6.44	1 10 0
Foundry, for export	8.16	1 18 0

Where no separate export prices are given, same quotations apply to domestic and foreign business.

German Market

Prices Last Reported

	$	Pounds per metric ton (2205 lbs.)
PIG IRON		
Hematite	23.60*	5 10 0
Foundry, No. 3	20.04	4 13 5
Stahleisen, Siegen		Nominal
Foundry, No. 1	20.49	4 15 6
Luxemburg Foundry, No. 3		Nominal
COKE		
Lower Silesian furnace	8.30	1 18 8
Lower Silesian foundry	8.65	2 0 4
SEMIFINISHED STEEL		
Billets	26.17	6 2 0
Sheet bars	27.46	6 8 0
Wire rods	32.39	7 11 0
FINISHED STEEL		
Standard rails	30.03	7 0 0
Merchant bars	30.03	7 0 0
Structural shapes	29.61	6 18 0
Ship plates	35.83	8 7 0
Medium plates, 3 to 5 millimeters	38.82	9 1 0
Sheets, 1 to 3 millimeters	39.77	9 4 0
Tin plate, per box of 575 kilograms	5.58	1 6 0
Plain wire		Nominal
Bands and strips	38.61	9 0 0

All prices are f.o.b. furnace or works.
*German prices now are quoted in pounds, sterling.

French Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Hematite, Lorraine	18.24	440
Basic bessemer, Lorraine	15.75	380
Foundry, Longwy, No. 3, sand-cast	15.34	370
Foundry, Longwy, No. 3, chill-cast	15.75	380
Ferromanganese, 76 to 80 per cent	64.25	1,550
COKE		
French furnace	5.89	142
German furnace, f.o.b. frontier*	9.12	220
German furnace, f.o.b. frontier**	9.66	233
French foundry	6.51	157
SEMIFINISHED STEEL		
Blooms	19.48	470
Billets	20.93	505
Sheet bars	21.35	515
FINISHED STEEL		
Standard rails	24.04	580
Merchant bars	23.21	560
Angles	22.80	550
Normal beams and profiles	22.80	550
Plates, ship and tank, 10 millimeters and thicker	26.32	635
Plates, bridge and tank, 5 to 10 millimeters	27.36	660
Sheets, black, 3 millimeters	29.02	700
Sheets, blue annealed, 2 millimeters	32.33	780
Shafting, cold-drawn, 40 to 60 millimeters	47.67	1,150
Bars, 2 per cent nickel steel	76.68	1,850

All prices are f.o.b. furnace or works.
*Up to 50 per cent of normal requirements.
**Over 50 per cent of normal requirements.

Belgian Market

PIG IRON
Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
Basic bessemer, Belgian	14.22	405
Basic open-hearth, Belgian	14.92	425
Gray forge, Belgian	14.74	420
Foundry, No. 3, Belgian	14.56	415
Foundry, No. 3, Luxemburg	14.39	410
Foundry, No. 3, Lorraine	14.39	410
SEMIFINISHED STEEL		
Blooms	18.25	520
Billets	19.66	560
Sheet bars	20.18	575
Wire rods	28.08	800
FINISHED STEEL		
Standard rails	24.57	700
Merchant bars	22.46	640
Normal beams and profiles	21.06	600
Plates, 5 millimeters and thicker	25.45	725
Sheets, black, 3 millimeters	27.73	790
Sheets, galvanized, 1 millimeter	67.57	1,925
Plain wire	42.12	1,200
Galvanized wire	52.65	1,500
Wire nails	43.88	1,250

All prices are f.o.b. furnace or works.

at £4 1s ($17.20) to £4 4s ($17.85) f.o.b. Antwerp. Demand is not as large as was expected and stocks are beginning to accumulate. Basic bessemer pig is quoted 405 francs ($16.20) in the home market, and tends toward 400 francs ($16) per metric ton. Belgian semifinished steel producers appear to be out of the market, and Lorraine and Luxemburg mills have not taken the lead, offering basic bessemer blooms at 515 francs ($20.60). Merchant bars are weak and concessions are offered on attractive business at 620 francs ($24.80) to 630 francs ($25.20) although this commodity is still officially quoted at 640 francs ($25.60) to 650 francs ($26) per metric ton. Basic bessemer bars for export are offered at £6 ($25.50) to £6 5s ($26.55) f.o.b. Antwerp; some tonnages have been sold in the Far East. Beams and structural shapes are priced at 600 francs base ($24). There is a satisfactory demand for small shapes. It is expected the Belgian State railway will be in the market for track accessaries. Wire is comparatively quiet.

More French Steel Than Before War

European Staff Special

Office of IRON TRADE REVIEW,
23 Rue de la Bienfaisance

PARIS, Feb. 1.—The French iron and steel market shows a tendency to be firm. Spot buying is active in the home market as stocks are generally depleted; orders are numerous but of comparatively small volume for immediate requirements. Export business is expanding German competition is not troublesome for the present and the French are still underquoting British prices, and French producers have to meet the Belgians, who are competing keenly.

(Franc—$0.045)

No. 3 foundry chill-cast pig iron, 2.5 to 3 per cent silicon, has been sold at from £4 1s ($17.20) to £4 4s ($17.85) f.o.b. Antwerp. The domestic price continues to range from 375

francs ($16.90) to 300 francs ($17.55). Hematite pig prices remain unchanged at about 440 francs ($19.80); this department is quieter, although a few orders have been taken for export. Pig iron prices may weaken on account of the modifications which are about to take place in the coke situation. The freedom of the coke market will be restored in France, activities of the S. C. O. F. being reduced to the distribution of reparations coke, the price fixed by approval of the reparations commission. As a result the price is expected to go down and 143.50 francs ($6.45) f.o.b. frontier has already been reported as probable; this would be 76.50 francs ($3.45) lower than the price of reparations coke during the past two months.

Semifinished steel finds an easy outlet in Great Britain at prices slightly over those in the home market. Basic bessemer billets are offered at about £6 ($25.50) f.o.b. channel port, while the domestic price ranges from 480 francs ($21.60) to 500 francs ($22.50) f.o.b. mill. Merchant bars have been quoted at £6 5s ($26.55) f.o.b. Antwerp.

A contract for about 400 tons of 20-kilo rails is on the point of being passed with the French colony of Reunion. The average price quoted by six competing mills is 563 francs ($25.35) per metric ton. About 300 tons of steel ties included in this contract are priced at 587 francs ($26.40) a ton. Saar ship plates have been quoted at 610 francs ($27.45) to 620 francs ($27.90) per metric ton and medium gage sheets have been offered at about 770 francs ($34.65). The number of furnaces blowing in France Jan. 1 was the highest since the end of the war and production figures for December 1923 constituted the year's high record. The December figures correspond to an annual production of 6,800,000 tons of pig iron and 6,300,000 tons of steel. The situation of the French iron and steel industry is now improving decidedly, due to greater facilities in obtaining coke. Not only are production figures higher than before the occupation of the Ruhr, but they are in excess of 1913. This is caused by the supplementary tonnage produced in Lorraine plants recovered from Germany. Pig iron production in 1923 was 170,978 metric tons in excess of 1922, and 92,581 tons over 1913. The steel output was respectively 505,594 and 289,869 tons over 1922 and 1913.

First American Steel Arriving in Japan

Foreign Special Service

TOKIO, Japan. Jan. 30.—The first cargo of Japanese government reconstruction material from the United States will arrive soon, and in the early part of February will be in the market. Already several boats carrying private purchases from the United States and Europe have arrived. Roughly 30 more boats are expected by the end of February carrying several thousand tons each of steel and lumber.

The Japanese government has endeavored to eliminate troubles for importers. The yen-dollar exchange rate, is almost stabilized by government announcement of its policy of financing the import trade. Although the Japanese Steel institute has just protested against keeping steel and iron on the free list the government will renew the emergency tariff ordinance as soon as it expires at the end of March, enabling importers to keep up their regular supply of reconstruction needs.

The political situation here is developing unfavorably. It is feared the reconstruction of Tokio and Yokohama will have to be deferred. The solution of the fire insurance problem, which is deemed as necessary by the public for speedy rebuilding of houses, is being forgotten as political scrambles grow hotter. Although the Japanese Engineers' association is carrying on a campaign on behalf of afflicted people it obtains no hearing. The government is now urged to avoid mixing restoration problems with political issues.

In the pig iron market No. 1 Japanese is quoted at 66 yen per ton; No. 2 at 64 yen per ton; No. 3 at 60 yen per ton; No. 1 Hanyang at 64 yen per ton; Bengal pigs at 63 yen per ton and Cleveland nominally at 90 yen. In the steel market round bars are quoted at 4.35 yen per 10 kwamme; square bars 4.75 yen per 10 kwamme; flat bars 4.85 yen per 10 kwamme; sheets 8 yen per 10 kwamme. Plates are quoted at 4.60 yen per 10 kwamme and nails are nominally at 13.50 yen per keg.

Today's exchange is yen 46 cents. The official rate is yen 47½ cents. Kwamme is equal to 8.2673 pounds.

Ford Inquiring for Ore

Cleveland, Feb. 19.—A formal inquiry from the Ford Motor Co. for 250,000 tons of iron ore, its usual requirement in the open market, is the first that has been submitted to producers. The majority of the operators seem to think this is too early to submit prices, and judging by their expressions it will be six weeks before figures for the season are established. Furnace interests when discussing their ore needs say they believe ore prices should be lower, while the sellers counter with arguments why the prices should be higher. Nothing definite has developed to indicate if the prices will be changed from last year's level.

Ocean Iron and Steel Freights Vary as Shippers Bargain

LONDON, Feb. 5.—Owing to competition between British, German and other steamships and to lack of such a controlling body as the interstate commerce commission, ocean freight rates on iron and steel are extremely irregular. Occasionally different parcels will be carried on the same ship over the same route at different prices. The rate actually obtained by a shipper depends entirely on his knowledge of the freight market and ability to negotiate with brokers and shipping agents. No such thing as a fixed schedule of ocean freight rates prevails on any route. The rates for pig iron are particularly subject to variation because ships which are frequently going to certain ports in ballast, especially from Europe to North American ports either on the Atlantic or Pacific coasts, are willing to take pig iron instead of sand as ballast at very low rates. The same applies to ferromanganese and to iron ore from the Mediterranean and Spain to Philadelphia and other American ports.

Ship brokers in London have recently quoted freight rates of 17s 6d ($3.68) per gross ton on pig iron in lots of 500 tons or more from Antwerp to San Francisco. One parcel has been fixed at this rate. From Hamburg the rate at present is about 18s 6d ($3.90) a gross ton with about the same quotation from Middlesbrough or Glasgow to San Francisco. Finished steel to the Pacific coast, except tin plate and galvanized sheets, is being handled at present at about £1 10s ($6.32) per gross ton, equivalent to 28 cents per pound. This is for 10 tons or more by regular liners, the pig iron rates quoted above being for cargo tramps.

To the Atlantic coast few rates are being made but a recent quotation of pig iron to Philadelphia or Boston was 12s 6d to 13s 6d per gross ton ($2.63 to $2.84) from Antwerp with 1s ($0.21) additional from Hamburg. From Middlesbrough or Glasgow the pig iron rate to Boston is 15s ($3.16) per gross ton. The rate on finished steel from Europe to North Atlantic coast ports is about £1 5s ($5.26) a ton but no business has been done recently. Tin plate will be taken to the Pacific coast for around 1s 7d ($0.34c) a box and for 1s 6d ($0.32c) to Montreal.

From North European ports to the Far East such as Hongkong, Shanghai or Kobe, the rate on finished steel at present is about £2 ($8.44) a ton, equivalent to 38 cents per pound. To India the rate is about £1 ($4.21) a gross ton and to Australia £2 ($8.42) per ton.

Ship Repairs Increases; New Building Declines

New York, Feb. 19.—During 1923 the ship repair business of the Bethlehem Shipbuilding Corp., Ltd., showed an increase over 1922 of 22 per cent in number of ships repaired; 23 per cent in tonnage of ships repaired, and 25 per cent in billings per ship repaired. In a statement issued today, Eugene G. Grace, president of the corporation said:

"Shipbuilding has declined throughout the world during the past few years. According to a recent statement by Lloyd's Register, world ship construction for last year was less than a quarter of that for the record year 1919 when 7,144,000 gross tons of merchant shipping was sent down the ways.

"That the old ships are gradually wearing out is indicated by the steady increase in Bethlehem's repair business. The ships repaired by the Bethlehem plants last year were registered at a tonnage of 9,748,872, or equivalent to 59 per cent of the total merchant marine tonnage of the United States. The number of the ships repaired in the past three years in Bethlehem yards with their total tonnage was:

Year	Number of Ships	Tonnage
1921	1158	4,674,000
1922	1983	8,005.000
1923	2415	9,748,000
Total	5556	22,427,000

"From the point of view of dollars and cents the foregoing repair work would be about equivalent to the complete construction of 30 steel cargo vessels of an average tonnage of 5000 tons.

"During 1923 Bethlehem constructed in her various yards 25 steel vessels of 45,854 gross tonnage, of which 15 were for strictly commercial uses, including cargo ships tankers, ferry boats, barges and car floats. On Jan. 1, 1924 Bethlehem had under construction, or under contract to build for private ship owners. 14 steel ships of a gross tonnage of 17,500.

Structural Fabricating Companies Merge

Wheeling, W. Va., Feb. 19.—J. E. Moss Iron Works has taken over the Riverside Bridge Co. as a result of favorable action by stock holders of the two companies. The Moss works plans to increase its capital stock to $1,000,000 common and $500,000 preferred. The board of directors probably will consist of J. E. Moss, R. R. Kitchen, F. G. Jolliffe, Alexander Glass and A. C. Whitaker. The last two have been officials of the Riverside company. Mr. Moss will remain as head of the combined companies with Mr. Kitchen as vice president and Mr. Jolliffe as secretary.

J. H. Lesch, who has been vice president and general manager of the Riverside company will be general manager for the combined companies. G. A. Partenfelder will be operating engineer, C.. E. Crook, chief estimator. Thomas C. Jenkins, general superintendent, George E. Seibert, chief engineer and H. O. Laupp. purchasing agent. Mr. J. G. Stromp, at present assistant general manager, will remain in the same capacity and also will be in charge of sales.

Branch offices in Cleveland Charleston, W. Va., and St. Louis will be retained and others added. The company's offices at Twenty-eighth and Chapline streets, Wheeling, will be enlarged.

Virginia Iron Gross Gains

The Virginia Iron, Coal & Coke Co. for 1923 reports gross earnings on $7,918,766 against $4,354,846 in 1922, and net income, after all expenses and charges for interest and taxes, of $456,664 against $575,303. After payment of dividends last year there was reported a deficit of $143,146 against a surplus after dividends of $325,583 in 1922. The balance sheet on Dec. 31, 1923, showed a profit and loss surplus of $628,890 against $772,012 in 1922. Inventories were valued at $1,416,854 against $1,636,161, cash of $150,693 against $194,511 and bills and accounts receivable of $508,882 against $196,455. Accounts payable totaled $8696 against $10,278 and unpaid payrolls $288,801 against $300,934.

Baldwin Sales Higher

The annual report of the Baldwin Locomotive Co., Philadelphia, for 1923 shows largest gross business since 1918, and second largest annual total in history of the company. Gross sales aggregated $102,762,075 against $33,087,259 in 1922 and $123,179,252 in 1918, the latter being the highest on record. Operating income last year aggregated $10,184,755, the third largest annual total on record. A feature in 1923 report is the deducting of $2,800,000 from profits to be set aside for a dividend reserve for 1924. This amount is equal to dividend requirements on preferred and common stock for full year 1924, at the current rate of 7 per cent annually paid on each issue.

French Mills Divide Order

Societe Metallurgique d'Aubrives et Villerupt, Aubrives, France, participated in 12,000 tons of cast iron pipe for Porto Rico. This was reported in Dec. 6 issue of IRON TRADE REVIEW, page 1531 of the Paris market letter as originally having been divided between the Societe de Pont a Mousson, Pont-a-Mousson, France and the Cie. General des Conduites d'eau, Liege, Belgium.

Scrap Declines Further

(*Concluded from Page* 518)

of the award and the miscellaneous scrap brought relatively high figures. Some short orders for Ohio points such as Warren and Massillon probably were covered. The average open hearth operation in this district is above 90 per cent and one or two plants are operating full. The Carnegie Steel Co. recently brought in 3000 tons of scrap from its Mingo Junction, O., plant by barge. It is operating 94 per cent of its ingot capacity.

Dull Market at Cincinnati

Cincinnati, Feb. 18.—Iron and steel scrap demand is light and inquiries are small. The market is soft and prices are off 50 cents a ton on practically all items. Most mills have sufficient stocks on hand or due on contracts to meet requirements for thirty days. The Louisville & Nashville and Chesapeake & Ohio railroads are closing lists aggregating 9000 tons each.

Lower Range at Detroit

Detroit, Feb. 19.—Scrap prices are an average of $1 a ton lower this week due to inability of dealers to ship. Large consumers still maintain embargoes and inter-dealer trade has fallen off greatly since big producers have increased output.

Dealers say the outlook is for lower prices as several large consumers have indicated they will not be in the market for at least 30 days.

Much Tonnage Moving East

St. Louis, Feb. 18.—A strong undercurrent runs through the market for iron and steel scrap. Prices hold firm and the trend is upward, and steel and iron axles were marked up 50 cents per ton. While demand is good, strength is due more to conditions in other centers than to the local situation. Inquiries, particularly for steel, have been received from Chicago and points east, and much scrap has left St. Louis for eastern destinations during the past 30 days.

Industries here need scrap, but no large tonnages have changed hands. Buying is on a hand-to-mouth basis, with little further than 30 days. Rolling mill and malleable grades are active. All material suitable for blast furnaces is meeting ready sale, and steel specialties continue strong. Yard stocks are in fair volume, but well balanced. The principal railroad lists before the market were as follows: Louisville & Nashville, 8500 tons; Missouri, Kansas & Texas, 1800 tons; Rock Island, 3000 tons; Texas & Pacific, 600 tons and San Antonio & Aransas Pass, 7500 tons. The latter offering is the first made by this road in three years.

Scrap Selling Freely

Birmingham, Ala., Feb. 19.—Iron and steel scrap has been selling more freely and dealers are being asked to sell into third quarter though sales have been reported that far ahead. No. 1 cast, stove plate and turnings and borings are most active. Active demand in the north does not affect the local market as freight rates prevent shipment from here.

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Traffic Attests Industrial Speed

BUSINESS developments since the first of the year have overturned the great majority of January forecasts. General expectations, as indicated by the tenor of those predictions, were for a steady, stabilized movement of trade. Certainly few observers looked for a swift and sweeping upswing as in the spring of 1923. Yet that is precisely what has happened in a number of basic activities. It is true of iron and steel, of automobiles and of building.

Most impressive of all, it is true of freight traffic. When the year began, freight movements were running at a relatively low point. It appeared probable that the railroads would have a breathing spell after their magnificent achievement of efficiency in 1923. For the first two weeks of the year weekly car loadings fell below the corresponding period of one year before. A rapid increase followed and in the succeeding two weeks traffic was 3 per cent ahead of 1923.

In the week ended Feb. 2, car loadings climbed to 929,000 or 7 per cent ahead of the same week of one year ago. The significance of this showing lies in the fact that early in 1923 industry was expanding at a rapid pace. Yet it was not until the last week of March in 1923 that car loadings touched the high level attained at the beginning of February this year.

Part of the rise in traffic has been due to heavier coal movements against a now vanished coal strike, possibility. Yet shipments of all groups of commodities have gained over 1923 except coke and ore. This fact is causing railroads to consider a plan of efficiency for 1924. It is also leading them to enlarge their inquiries for new equipment. High car loadings indicate the current high pitch of industrial activity. Some express the fear that trade is developing a speed too great to last. Thus far, however, few unhealthy signs have appeared and activities seem based upon a healthy demand stimulated by big purchasing power and ample credit.

Iron Mine Accidents Infrequent

THE recent death by drowning of 41 men in a small iron ore mine in the Lake Superior district serves to emphasize the remarkable freedom of the industry from such catastrophes. The nearest approach to the severity of this accident at the Milford mine afforded by the records of the industry is a report of a similar mishap at the Mansfield mine, Menominee range, in 1893. The ground around a timber shaft caved in, and "for two hours the bed of the Michiganme river below the mine was dry as the stream flowed into the workings," drowning 27 men. At the Milford mine, Cuyuna range, a cave-in released a flood of water from a nearby lake. In the 31 years that have intervened between these accidents, during which time considerably more than a billion tons of iron ore have been moved from the district, nothing has occurred entailing anything like such loss of life in mass. The whole industry practically has been developed in that period. The incidents are in strong contrast with the customary records of the mining operations.

Accidents at metal mines in the United States in 1922, the latest year for which complete statistics are available at present, resulted in the death of 344 men, indicating a fatality rate of 3.54 per 1000 full-year 300-day workers. The fatality rate for iron mines in the country was 3, the same as for the copper mines; 5.35 for gold and miscellaneous metal mines, and 4.89 for coal mines. The rate for all classes of mines in Michigan was 2.17; in Minnesota 3.03, and in Wisconsin 3.61.

While this method of calculating fatality rates is the standard and used by the government, the figures do not appear to present an adequate picture, when increase in production is considered. For instance, an official record shows that for seven years ending with 1894 there were employed in the iron mines of Michigan an average of 13,770 men per annum, and during that period 400 men were killed. The death rate per 1000 per annum was 4.49. Production of iron ore in the state during the seven years totaled 29,000,000 tons. The government report for the 5-year period, 1917-1921 shows the fatality rate for all classes of mines in Michigan was 3.05, but production of iron ore alone in those five years amounted to 76,000,000 tons. Such comparisons might be made between industries on a

production basis to the advantage of iron ore, but in that case the special hazards involved also would be a factor.

The number of men killed in coal mines in the United States in 1923 was 2452, and production of coal totaled 641,476,000. The fatality rate on this basis was 3.82 per 1,000,000 tons.

Approximately 40 per cent of the iron shipped from the Lake Superior district is mined underground. Surface mining also incurs many hazards. The operators are handicapped by having to train illiterate or inexperienced men in mining and safety. Systematic safety work is as much a part of the industry as it is of any other which follows the modern practice of putting human protection above production. In educational and mechanical means to safety, millions of dollars and great personal effort have been expended with remarkable results, despite this rare and isolated case of tragedy.

Encouraging Technical Discussion

FROM the standpoint of engineering and scientific development, one of the most gratifying tendencies of the time is the growing enthusiasm manifested in round-table discussions of problems of research and practice. Members of technical societies, many of whom attend from two to perhaps a dozen national conventions annually, must have noticed that during the past few years there have been a few outstanding instances in which all restraint has been abandoned and members have talked freely and without fear that their remarks might embarrass themselves or the companies by which they are employed.

Unfortunately the programs of few national meetings permit open and extended discussion of this kind. In perhaps nine out of every ten technical sessions held in this country, so much time is devoted to the presentation of papers or reports that little if any opportunity is left for discussion. Moreover, the atmosphere of the meeting is so sternly formal that engineers or metallurgists who have had only a limited experience in speaking publicly hesitate to take the floor. There can be no doubt that the method of conducting the average technical session restrains enthusiasm and discourages free discussion.

Of course free discussion often is undesirable. In many instances well planned programs have been ruined by the failure of weak chairmen to shut off irrelevant remarks. Again in cases where discussion has been invited, it often deteriorates into an uninteresting argument unless the chairman maintains a strong grip on the proceedings.

In view of these factors, it would seem that programs should be arranged to cover two distinct types of sessions. One would be formal, with preference being given to the presentation of papers and reports. The other would be informal, with provision for few if any papers, and with a plan for free discussion along definite preconceived lines. Such a session could be held in conjunction with a luncheon, and might well be patterned after the unusually successful symposium on electric furnace operation held at Dayton last September by the American Electro-chemical society.

Fortunately the merit of the round-table talk is being recognized by a number of the leading technical organizations. If properly handled, the symposium or colloquim plan of encouraging discussion will bring to light ideas and opinions that never would be publicly expressed under the general policy now followed in conducting technical meetings.

Something New in Government

DISTINCT from all other governmental agencies of the present or past, because it co-operates and is helpful to business, instead of hampering and blocking every effort to greater efficiency, the department of commerce stands forth as a city on a hill whose light cannot be hid. Its helpfulness is demonstrated to all business men who come into contact with its activities. It is safe to say no other arm of the government ever has occupied such a position.

In startling contrast to this department is the federal trade commission, planned and established to aid business but degenerated into a common scold and a busybody, hanging as a weight about the neck of business instead of giving it seven-league boots to aid its progress. That this body as at present constituted under the emasculated law which congress passed creating it, is wrong in its conception of its purpose has been proven so often when it has taken its case to court that its utter needlessness and lack of constructive service have been made certain.

On the contrary the department of commerce has worked along the lines of rational policy and has become an aid of great value. Business has been quick to recognize the honest effort of Secretary Hoover to assist legitimate endeavor and he has found active co-operation wherever he has asked it. In this he has met the specter of bureaucracy in efforts to discredit trade associations the purpose of which is to gather pertinent statistics of industry. Should the opinions recently given by the attorney general as to the proper and limited scope of trade associations under the law, become fixed rules of conduct, business would suffer by being deprived of the valuable information thus made available for its general use.

The example of interested helpfulness presented by the department of commerce is refreshing and is something new in government. It represents true co-operation and counsel instead of restraint and galling regulations so often imposed by those in public life who have small conception of business and its problems.

Wheel Plants Bought by Brake Shoe Maker

Pittsburgh, Feb. 19.—Sale of the National Car Wheel Co., Pittsburgh, with plants in Cleveland, Rochester, N. Y., Sayre, Pa., and West Homestead, Pa., to the American Brake Shoe & Foundry Co., New York, has been confirmed. The sale also involves the Pennsylvania Casting & Machine Works, subsidiary company at Preble avenue, North Side, Pittsburgh.

Andrew Muirhead, formerly assistant secretary of the National Car Wheel Co., just elected treasurer of the reorganized company, said: "No changes in management are planned at present and the name of the company will be retained. The majority of the stock was purchased by the American Brake Shoe & Foundry Co., after several weeks negotiation."

William F. Cutler of New York, is president of the new organization; George M. Judd, secretary; Joseph B. Terbell, chairman of the board of directors and Andrew Muirhead, Pittsburgh, treasurer. C. M. Bower, Frank C. Turner, J. H. Yardley and E. H. Chapin, all of New York and J. F. Weisbrod of Pittsburgh were named vice presidents.

The National Car Wheel Co., was formed in 1903 by the Keystone Car Wheel Co., Pittsburgh; the Rochester Car Wheel Works, Rochester, N. Y.; the Cayute Wheel & Foundry Co., Sayre, Pa., and the Mather Wheel & Foundry Co., Cleveland. The annual output was 120,000 tons. The company had $65,000 in 7 per cent preferred and $1,224,000 common stock. A stock dividend of 4 per cent was paid in 1921.

Steel Foundries Gain

The American Steel Foundries, Chicago, reports operating income of $9,031,456 for the year 1923, after deducting all expenses and charges for federal taxes. This compares with operating earnings of $4,481,840 in 1922. After deducting reserves for depreciation and crediting other income, there was reported net profits of $7,595,944 in 1923. In connection with the annual report, President Lamont predicted that equipment business for 1924 would equal about two-thirds the total for 1923. The company's plants, it was stated, were operating at about 50 per cent of capacity.

Sales Are Large

The Allis-Chalmers Mfg. Co., Milwaukee, for the quarter ended Dec. 31, 1923, reports sales billed totaling $7,443,503, against $5,863,654 in the same period in 1922. Net profits for the December quarter were $849,547. In the last quarter of 1922 the company reported net profits of $479,985. For the full year 1923 the company, according to the quarterly reports, billed sales of $18,169,305, against $20,794,045 in 1922. Net profits for 1923 were $2,703,636, against $2,208,549 in 1922. Unfilled orders on hand Dec. 31, 1923, aggregated $12,000,132, against $12,575,000 on Sept. 31, 1923, and $8,215,545 on Dec. 31, 1922.

Weirton Breaks Record

Weirton, W. Va., Feb. 19.—During January the Weirton Steel Co. accomplished the largest operation in its history. For the second time in the past three months its steel production exceeded 50,000 tons. Total production for all finishing mills exceeded that of any previous month, shipments were highest in history, and the largest tonnage of hot and rolled strip steel was rolled. The output of billets, slabs and sheet bars also reached the highest point. All of its mills are scheduled for full operation during February and indications point to heavy operations later.

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Steel Castings Bookings Show Larger Gain

Washington, Feb. 19.—January sales of steel castings totaling 49,164 tons showed the largest increase since March and was the highest monthly total since August when 50,515 tons was sold, according to the department of commerce. Sales of railway specialties in January totaled 18,970 tons or 49.5 per cent of capacity while miscellaneous castings bookings amounted to 30,194 tons or 51.5 per cent of capacity. Operations in January were 50.7 per cent as compared with 42.4 per cent in December.

The accompanying figures are based on the reports submitted by 65 identical companies with a monthly capacity of 96,900 tons which represents over two-thrids of the commercial castings capacity of the United States. Of the total capacity, 38,300 tons are devoted usually to railway specialties and 58,600 tons to miscellaneous castings.

1922	Total net tons	Per cent capacity	Railway specialties net tons	Miscellaneous net tons
Jan.	100,605	103.8	47,879	52,726
Feb.	90,152	93.0	39,845	50,307
Mar.	143,564	148.2	76,409	67,155
April	90,968	93.9	39,610	51,358
May	89,493	92.4	38,788	50,705
June	84,878	87.6	42,773	42,105
July*	52,066	53.7	16,741	35,325
Aug.	50,515	52.1	18,332	32,183
Sept.	47,574	49.1	21,685	25,889
Oct.	37,446	38.6	9,840	27,606
Nov.	39,660	40.9	12,916	26,744
Dec.	41,098	42.4	15,182	25,916
1923 totals	803,019	....	380,000	488,019
Mo. av...	72,335	74.6	31,667	40,668
1924				
Jan.	49,164	50.7	18,970	30,194

*Two companies with a capacity of 785 tons per month on miscellaneous castings now out of business.

Steel Car Income Gains

The net income of the Pressed Steel Car Co., for 1923, after depreciation, maintenance and other charges, was $1,706,861. Operations for 1922, after the same deductions, left a deficit of $341,688 at the close of the year. Payment of preferred dividends brought the deficit for the year up to $1,216,688. Allowance for depreciation, maintenance and other charges, was $1,093,112 in 1923 compared with $400,000 in the preceding year.

Replogle Shows Deficit

The quarterly report of the Replogle Steel Co., Wharton, N. J., together with that of the Wharton & Northern and Ferro Monte railroads, for the three months ended Dec. 31, 1923, shows a net loss of $235,747 after depreciation and maintenance. This compares with a deficit of $79,789 in the preceding quarter and a deficit $18,741 for the quarter ended June 30, 1923. The net loss for the full year amounted to $427,811.

The Business Trend

February 21, 1924

BY JOHN W. HILL, FINANCIAL EDITOR

MEASURED by some important standards industry has reached a higher pitch of activity than one year ago. Freight traffic, construction awards, mail order sales and automobile output all have passed early 1923 records.

In iron and steel, recovery has been more rapid than for any similar period in recent years. January ingot output gained 17 per cent over December. One year ago the January increase was only 7 per cent. Unfilled orders rose 7.8 per cent against 2.31 per cent in January 1923.

Most impressive of all records is that of traffic. In the week ended Feb. 2, car loadings reached 929,000. This was fully 7 per cent ahead of the same week one year ago when trade was expanding vigorously. In 1923 car loadings did not touch so high a figure until April.

As a result, the roads which expected traffic to fall below 1923, are faced with another test of their efficiency. To the steel industry rising traffic totals are significant. They mean enlarged expenditures for improvements. Freight car buying already is increasing.

Employment Higher

Employment also exceeds that of one year ago. The government reports that 1428 representative firms had 2,006,000 employes on the payroll in January, This was a gain of 1 per cent over December and 3.5 per cent over January 1923.

The stock market developed an attack of hysteria last Friday. Shares plunged down. The oil scandal, the vanishing prospects that surtaxes will be cut to the Mellon level of 25 per cent and too rapid share advances were influences in the reaction.

The quick steadying of shares, the oversubscription to the $10,000,000 plan for relief to stricken banks and farmers in the northwestern wheat section and the success of the Japanese reconstruction loan of $150,000,000, disclosed basic financial strength and confidence.

Japan is Buying

Japanese buying is expected to stimulate construction material markets. Other favorable developments are the improvement of copper, growing indications of soft coal peace and high commodity prices. In Europe the forthcoming Dawes reparation report is arousing high hopes.

For the first time since the first of the year expanding credit needs of trade have checked the unprecedented mounting of banking resources. Last week the federal reserve system's rediscounts increased slightly and the high cash ratio dropped slightly.

Present banking conditions assure ample credit for some months. The possibility of inflation exists. It is heightened by continued heavy gold imports, which were $45,000,000 in January, the largest in months.

The Barometer of Business

Weekly Composite

	Last week	Week before	One mo. ago	One year ago	1913
Business failures..	363	377	525	395	...
Cash ratio Fed. Res. System, %..	80.9	82.1	80.1	75.3	...
Loan rate, 4-6 mo. N. Y. %.....	4¾-5	4¼-5	4¼-5	4¼	4½
Aver. 25 indust'l shares	$111.32	$113.96	$110.33	$115.03	$58.19
Aver. 25 railroad shares	$60.14	$60.88	$59.95	$65.28	$82.90
Aver 40 bonds...	$77.91	$78.19	$78.21	$78.40	$93.00
Car loadings, week ended Feb. 2.....	929,936	891,326	703,206	865,414	*762,680
Bank debits, 246 cities (000 omitted)	$8,521,255	$10,398,997	$10,525,824	$8,474,460	.....

*1920.

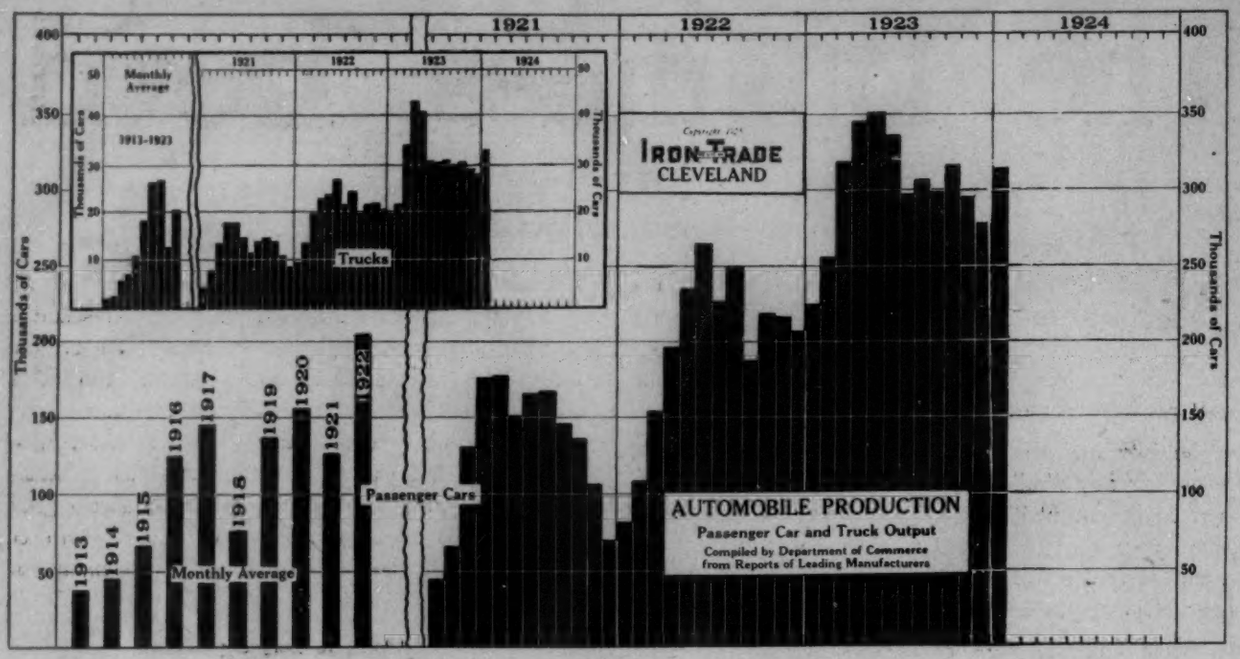
Foreign Exchange (Demand)

	Normal	Last week close	One week before	One month ago	One year ago
Sterling	$4.86	$4.29	$4.31	$4.23	$4.69
Francs	19.3c	4.37c	4.57c	4.50c	5.96c
Lira	19.3c	4.33c	4.38c	4.35c	4.78c

Monthly Comparison

	January	Month before	Year ago	1913 Mo. average
Dodge Building awards in 27 states (sq. ft.)	48,867,000	48,096,300	39,142,700	31,250,000
Business failures: Number	2108	1841	2126	1336
Liabilities ...	$51,272,508	$51,614,730	$49,210,497	$22,732,000
Exports	$394,000,000	$426,798,000	335,000,000	233,195,000
Excess of gold imports	$44,993,832	$31,929,000	$24,347,965	†$630,716
*Bureau of labor price index...	151	152	156	100
Bradstreet's price index	142.7	143.6	148.4	100
Economist's British price index	171.5	168.5	159	100
Cost of living index	169	165.3	156	100
New incorporations	$955,632,000	$909,693,000	$913,901,000	$172,131,000
Railroad net earnings	*$72,000,000	$86,130,000	$79,155,000	$59,301,000

†Excess of gold exports. *December.

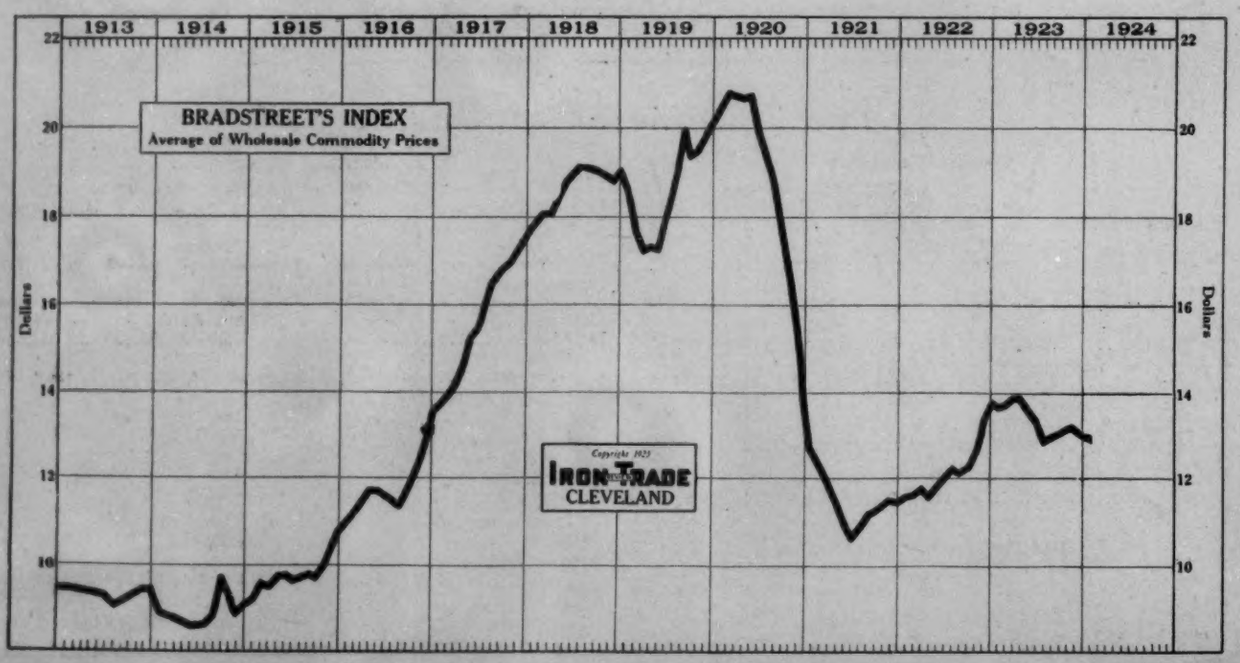


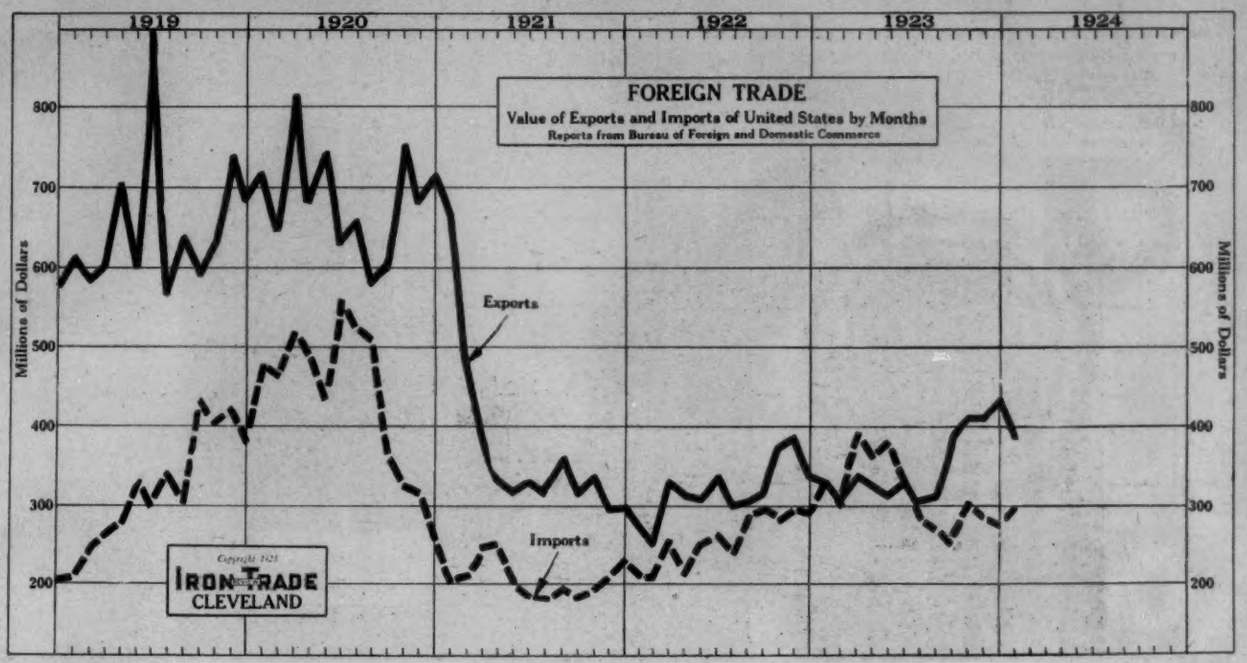
Automobile Production

ALL January records for production in the automobile industry were broken last month. The total of 343,000 passenger cars and trucks gained 13 per cent over December and 40 per cent over January of 1923. Mild weather, easy terms of sale, large industrial employment and improved agricultural conditions have combined to stimulate distribution. January automobile shows were a factor also. All but a few large companies are striving for further increases in February. A few have advanced prices.

Bradstreet's Index

THE Index of wholesale prices compiled by *Bradstreet's Journal,* declined in January. This was contrary to the movement of most other price averages, which advanced rather sharply. Bradstreet's index declined because of its heavy weight of textiles. Textiles provide the most conspicuous example of current commodity weakness. Nearly all other important groups of commodities are either firm or rising. This reflects abundant credit, moderate inventories, and expanding demand.



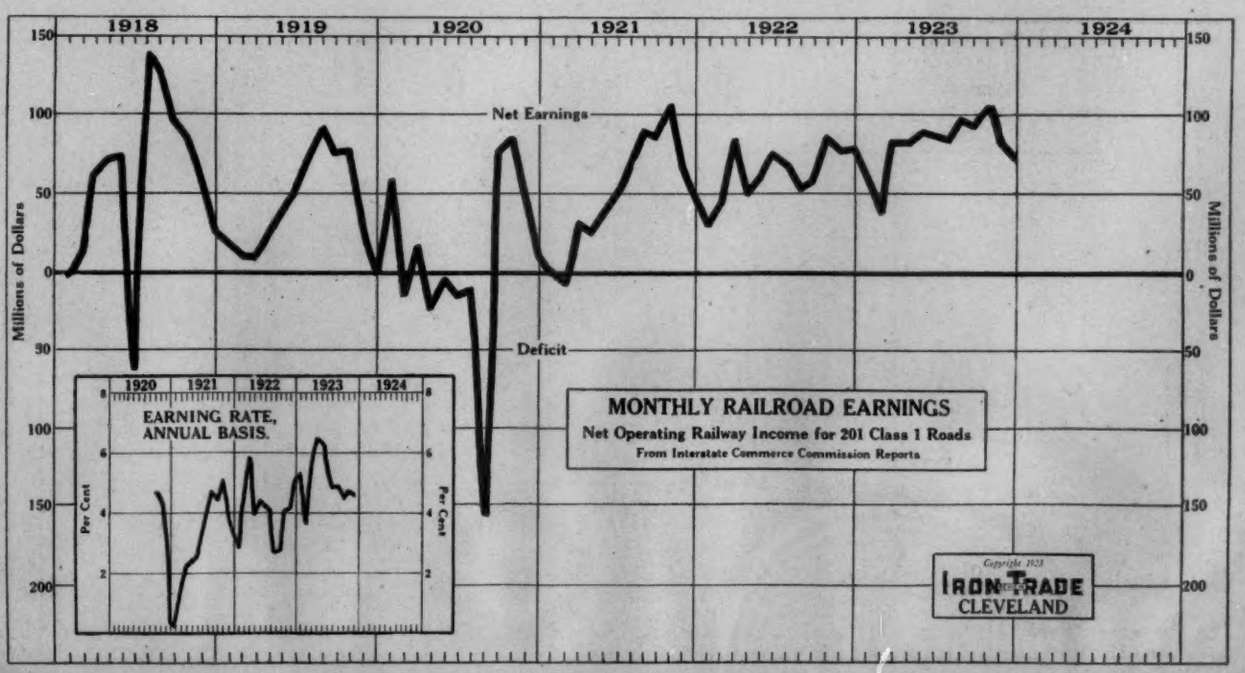


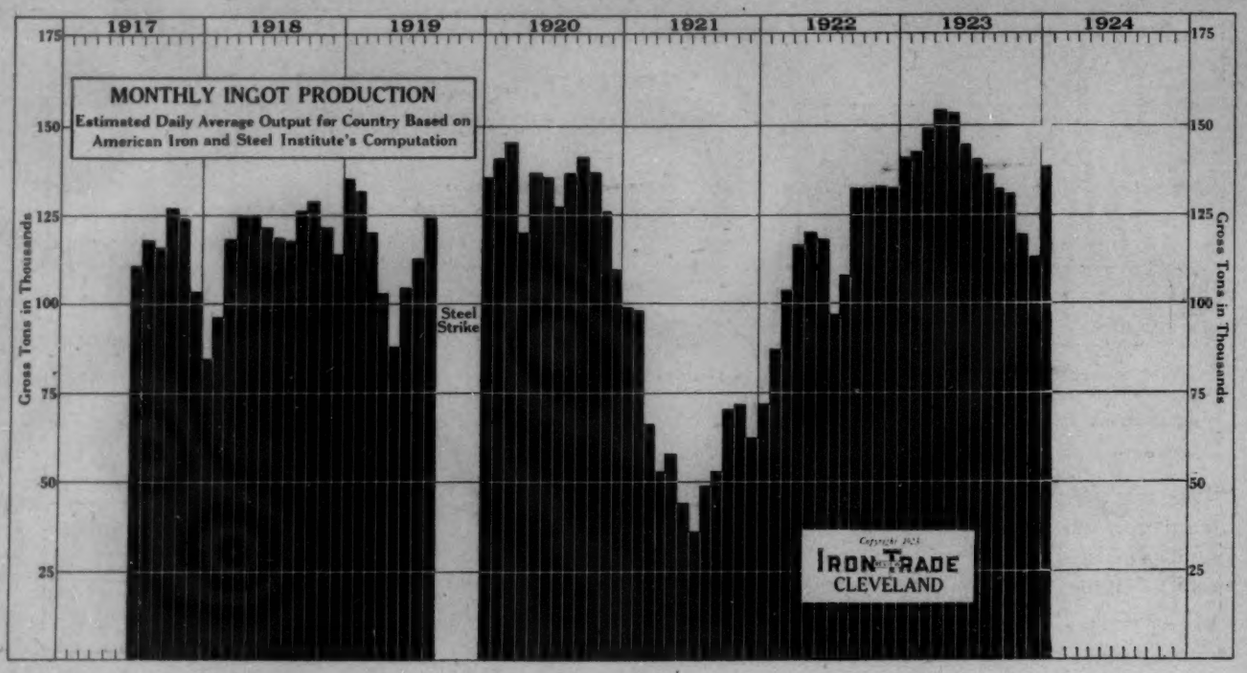
Foreign Trade

EXPORTS in January showed a seasonal decline from December. However, the total of $394,000,000 was the largest for any January since 1921. Relatively large exports were due to heavy shipments of high priced cotton. Imports of $299,000,000 gained over December. They were 9 per cent under the total for January in 1923, however. The balance of exports of $95,000,000 compared with only $6,162,000 one year ago. Gold imports continue enormous, the total of $45,170,000 being the largest with one exception in 27 months.

Railroad Earnings

DECEMBER, a month of declining traffic, brought a shrinkage in railroad revenues. The total approximated $70,000,000, according to early estimates. This compared with $86,000,000 in November and with $79,000,000 in December of 1922. The rising tide of traffic during the early weeks of 1924 is forcing the roads to consider a new program of efficiency similar to 1923. With greater traffic, earnings will increase and railroad purchases of material should be correspondingly larger. The buying of cars is already expanding.



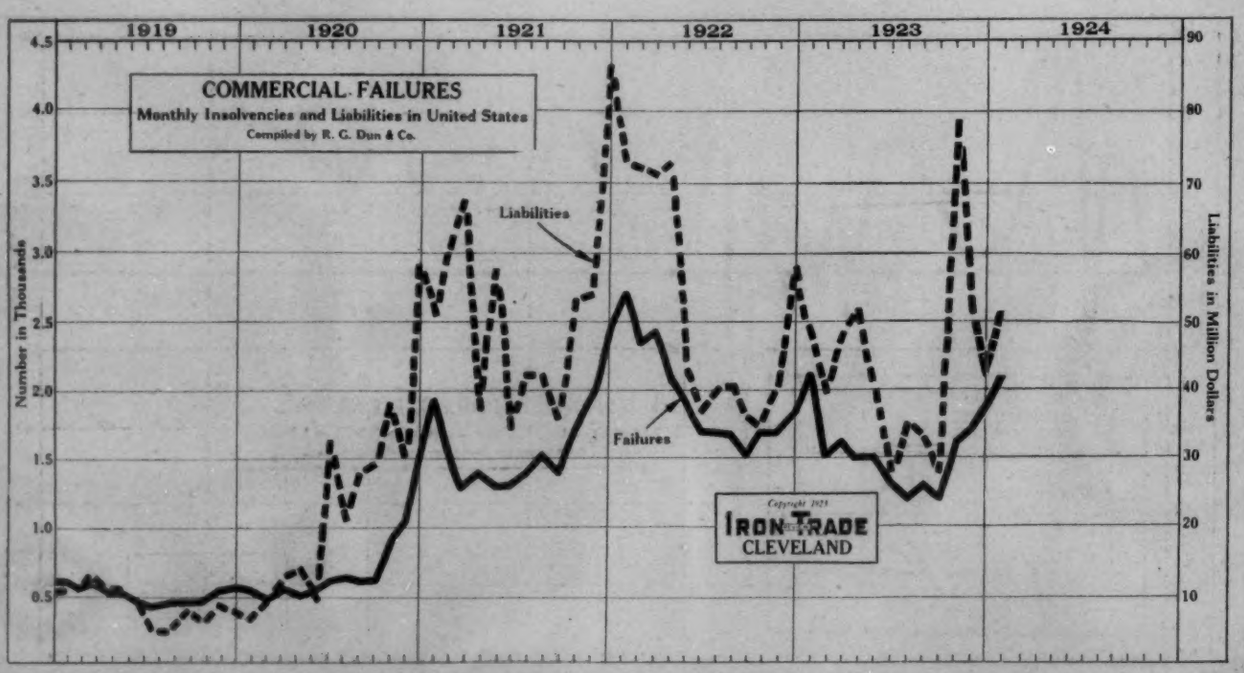


Ingot Production

THE sweeping recovery in steel mill operations is vividly reflected in the January upturn of ingot production. The daily average output of 133,000 tons was the largest since last August. It showed a gain of 17.2 per cent over December, thus scoring one of the most remarkable gains in the recent history of the industry. In January, 1923, ingot production increased 7.1 per cent over the preceding December. Curtailed output and buying last year, with continuing large consumption, laid the foundation for the rapid revival.

Commercial Failures

JANUARY brought a gain in business failures in the United States, The total was 2108 with liabilities of $51,272,508. The number of failures was the smallest for any January back to 1921. In January, 1923 there were 2126 defaults and in January, 1922 insolvencies numbered 2723. The aggregate of liabilities was slightly greater than that for January, 1923, but it was much less than the two years preceding. The peak of January liabilities was reached in 1922, with a total of $73,795,780.



Modernizes Heat Treating Shop

Rochester Gear Manufacturer Installs New High Temperature Continuous Automatic Electric Furnace for Hardening High Speed Gear Cutting Tools—Third Electric Unit To Be Installed—Plant Has Unique Features

BY E. F. ROSS

NOT many years ago, heat treatment departments, as such, were practically unknown. Treating methods were simple and consisted chiefly of heating the work to certain established temperatures and air-cooling or quenching in oil, brine, or water, depending upon the results to be attained. The equipment needed, therefore, was not extensive or elaborate—a coal-fired heating furnace and, in some cases, a blacksmith's forge, with suitable quenching tanks being all that was required. This equipment usually was located in the forge shop, machine shop, foundry, or wherever space permitted. Today, however, a different picture is presented. Heat treatment of semifinished or finished products has grown to such importance that now large and completely equipped departments are a vital part of metalworking plants.

Developments in heat treatment, both as regards technique and equipment, still are coming forward so rapidly that shops built a few years back and considered modern in every detail, no longer are equipped to produce work according to the best current practice. New equipment is being added from time to time to increase their efficiency as well as to reduce production costs. Obsolete equipment is allowed to stand idle until the pressure for expansion space forces its removal. A good example of the changes going on in a shop once considered the acme of completeness is to be found in the heat treating department of the Gleason Works, Rochester, N. Y. This shop was built and equipped eight years ago when the cramped condition in the main shop necessitated its removal to new quarters.

The author is editorial representative at Cleveland of IRON TRADE REVIEW.

A new building, approximately 50 feet wide and 150 feet long and of concrete and steel construction, was erected close to the main machine shop. About one-third of the floor space in the new building was utilized as a small repair machine shop for general plant maintenance while the remainder of the space was designated as the heat treating department. The building is of the V-type, monitor design of one story, but is sufficiently high that heat and smoke from the furnaces rise immediately to the roof where two rows of tilting windows, one on either side, permit their escape. These windows provide much light but, in addition, the side walls of the shop are well supplied with large metal sash windows. With roof roof trusses and side walls painted white, an abundance of daylight is afforded.

At present the arrangement of equipment is as shown in Fig. 4. All but three of the furnaces, which are of the automatic electric type, burn fuel oil. Included in the oil-fired equipment are three large carburizing furnaces, a heating furnace for large work, three tool hardening furnaces and a lead pot. The chief products of the Gleason Works are gears and

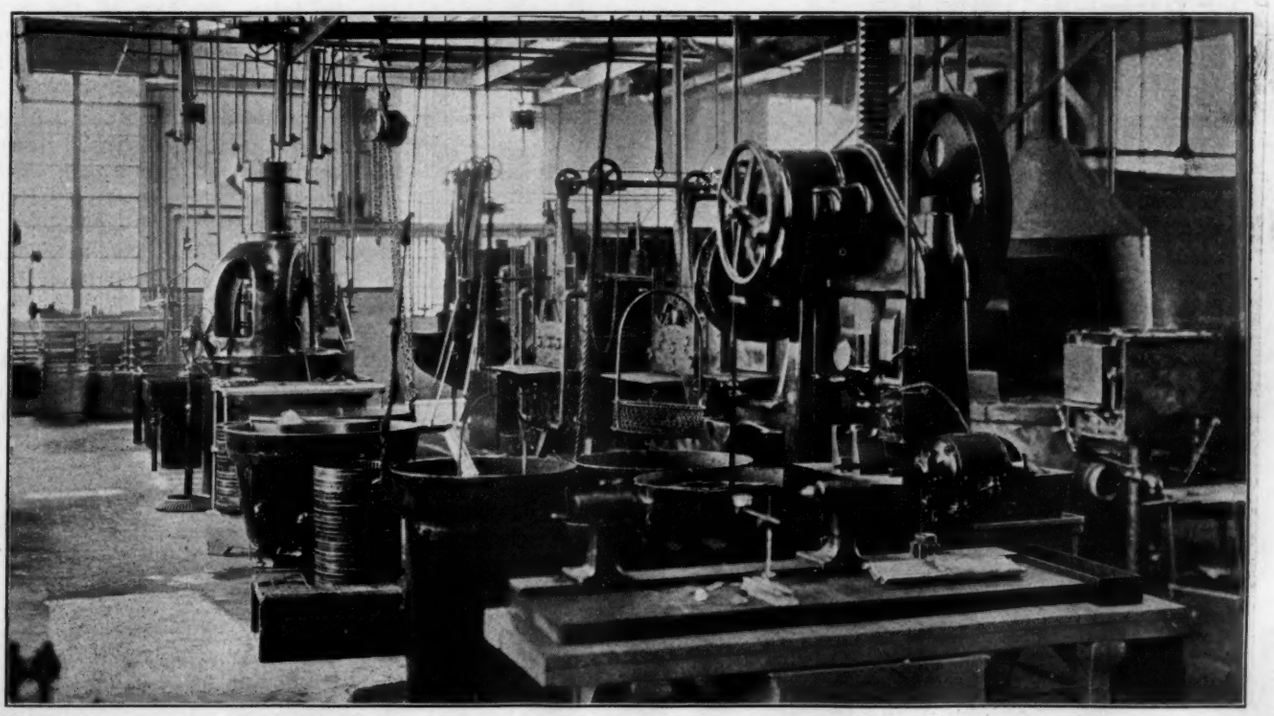


FIG. 1—A GENERAL VIEW OF THE HEAT TREATING SHOP OF THE GLEASON WORKS, ROCHESTER, N. Y. NOT ONLY IS THE EQUIPMENT WELL ARRANGED BUT IT IS MAINTAINED IN FIRST-CLASS CONDITION. AN ATMOSPHERE OF ORDERLINESS PREVAILS

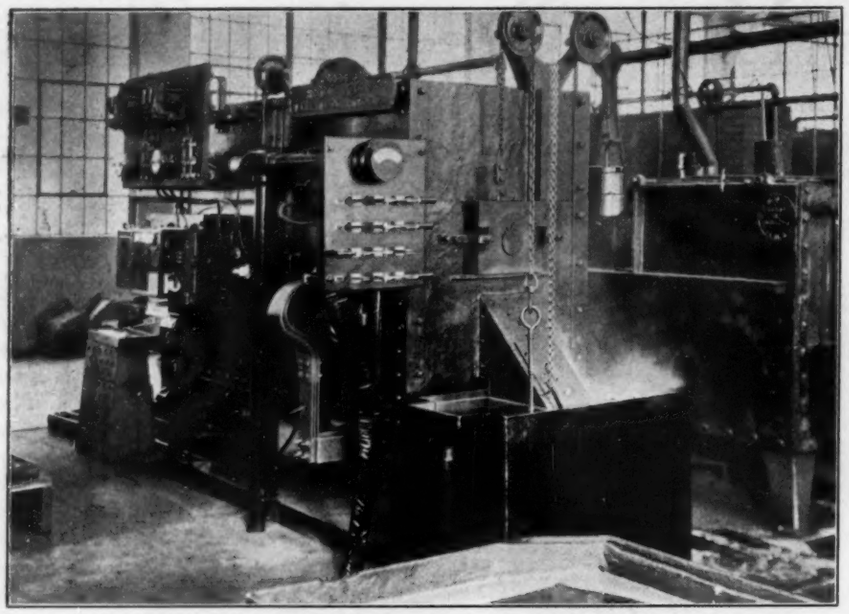


FIG. 2—A FRONT VIEW OF THE NEW HIGH TEMPERATURE CONTINUOUS ELECTRIC TOOL HARDENING FURNACE RECENTLY INSTALLED. , THE OIL QUENCHING TANK IS SHOWN IMMEDIATELY IN FRONT OF THE FURNACE

gear-cutting machinery, thus one of the principal heat treating operations is case hardening gear teeth. The gears, pinions, splined shafts and other work which is to be case hardened, are packed in a standard carburizing compound in suitable pots and placed in one of the three large oil-fired furnaces. The time and temperature of heating depend upon the class of steel and degree of hardness to be attained. Quenching is done in oil.

Case hardened gears are reheated to 1460 degrees Fahr. in a continuous type automatic electric furnace. This furnace was built by the Gleason Works two years ago at a time when continuous units of this type were unknown. The furnace hearth is made up of heat-resistant metal rollers, the speed of which can be adjusted to suit the class of work being heated. In actual operation, the temperature is controlled within plus or minus 10 degrees but this range can be reduced to plus or minus 5 degrees. The discharge end of this furnace, as shown in Fig. 1, is within easy access of two gear quenching machines and of two oil quenching tanks.

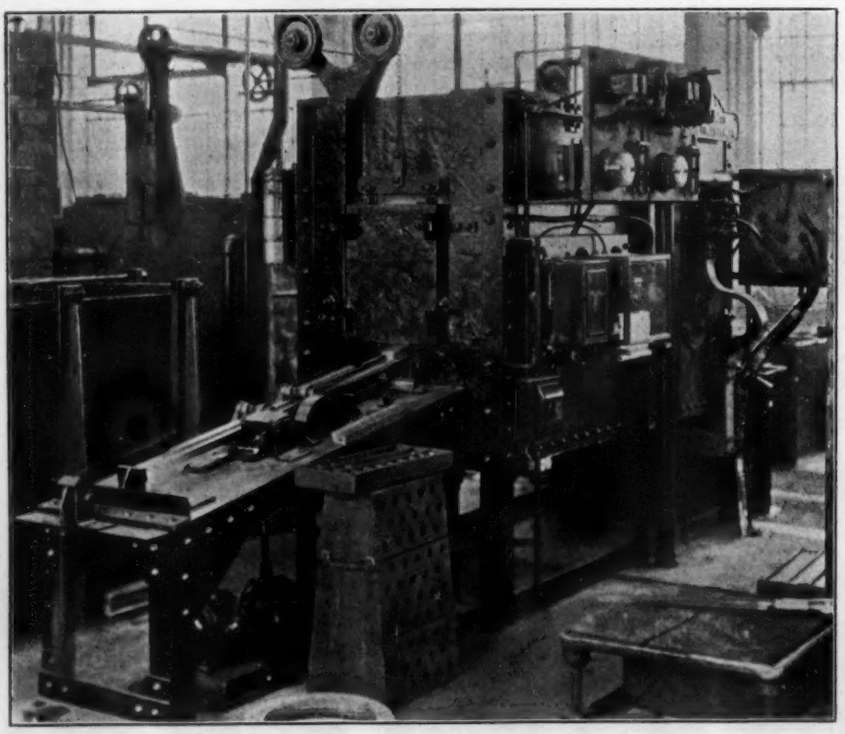


FIG. 3—THE CHARGING END OF THE NEW TOOL HARDENING FURNACE. THE TOOLS ARE PUSHED THROUGH THE FURNACE BY MEANS OF THE MOTOR-DRIVEN PUSHER ARRARGEMENT SHOWN ON THE INCLINED TABLE

Although not new, the gear quenching machines are of interest. Ring gears when quenched by direct immersion are liable to warp or shrink, and to eliminate this difficulty the Gleason Works several years ago introduced its gear quenching machines, three of which are in use in its own heat treating shop. Two of them are shown in Fig. 1. These machines consist of an upper and lower piston controlled by compressed air cylinders, each piston being provided with a die designed to fit the particular gear to be hardened. When the gear is removed from the furnace, it is placed on the lower die and the upper die is lowered by means of the control valve. As the upper die descends, a split ring expanding bushing enters the gear and as the die descends still further this ring is expanded inside the gear by a taper plunger. Not only does this action center the gear exactly but it prevents contraction of its inside diameter during quenching. Next the upper die forces the face of the gear securely against the lower die. Due to the fact that the upper piston is of larger diameter than the lower piston, continued application of air pressure on the upper piston forces the gear down into the oil bath where it is held at a pressure in excess of 5000 pounds until quenching is complete. To facilitate the circulation of oil, both the upper and lower dies are cored out and their faces are heavily slotted to permit the oil to be forced against all surfaces of the gear. Tests have shown that increased hardness is obtained by the forced circulation of oil. Gears quenched by this method are found to be uniformly flat and to have uniform inside diameters and rarely are pieces thrown out because of warping.

Work Is Copper Plated

As it is desirable to harden only the teeth and certain other parts of gears, protection against the carburizing compound is accomplished by copper plating the gears before the teeth are cut and before other finishing cuts are taken. Copper plating

machines, because of their acid baths, usually are installed in more or less isolated places, but in this case the equipment has been placed in about the center of the main machine shop bay, the location being such that gear blanks, splined shafts and other parts, pass directly from their last operation to the plating bath over the shortest route.

After being plated the blanks pass on to the machine operations next in order, where the teeth are cut and other finishing work is done. A view of the plating machine is shown in Fig. 5. It is a neat metal cased unit, provided with four compartments, two large and two small. Of the two large compartments, one is for cleaning and the other for plating while the two small tanks are for rinsing. An electrically-operated chain block hoist running on a suspended trolley is used to convey work to and from the machine and from one tank to the other. To promote cleanliness as well as to provide comfort for the operator, an iron grating is placed in front of the machine, thus any acid or water which splashes over is removed from under foot.

Before passing to the plating machine, work is washed in a boiling cleansing solution which removes all loose oil and foreign material. It is then lifted into the cleansing tank of the machine and supported on the anode bus bar. The cleaning solution, which is agitated and kept at a boiling temperature by live steam, is assisted in its work by electrolytic action and after a few minutes, the pieces may be removed perfectly clean. As the work is lifted out, it is dipped into clear water for rinsing. For copper plating, the pieces are suspended as cathodes in a cyanide solution, pure copper bars being used as anodes. Where the work is not too large it is placed in special racks which are supported by the negative bus bar, thus a number of pieces may be immersed in the bath or removed from it at one operation. The electrical equipment of the plating machine consists of a motor-generator set with the necessary control apparatus for regulating the direct-current voltage. Practice has shown that approximately 3.5 volts gives the best results, the work being left in the cyanide bath for about 15 minutes. These conditions produce a fine-grained copper coating approaching 0.0005 inch thick. This thickness has proved to be sufficient to resist attack of carbon during carburization. As proof of this, keyways have been cut with ease in 3.5 per cent nickel, 1.5 per cent chrome, 0.16 per cent carbon steel splined shafts which have been case hardened.

Without question, the equipment in the heat treating shop which attracts the most attention is a new high-temperature continuous electric tool hardening furnace, the only one of its kind in existence. This furnace, which is shown in Figs. 2 and 3, was installed some three months ago by the F. J. Ryan & Co., Philadelphia. When it is recalled that the chief products of the Gleason Works is gears, some idea may be obtained of the great number of high-speed tools needed for the automatic gear cutting machines. In view of the fact that these tools require a finishing temperature of 2350 degrees Fahr. before quenching, the company was confronted with a serious problem in obtaining uniform results on a quantity basis. Two oil-fired furnaces were used, one for preheating and the other for the high-temperature heat, but the lack of uniform heating conditions resulted in uniformity in the finished product. Consequently the company turned its attention to the development of a suitable electric unit.

As shown in Figs. 2 and 3, the furnace is compactly built. In reality it is two furnaces in one unit, but separated by a wall, and is entirely automatic in its temperature control. The preheating zone occupies about two-thirds of the chamber volume and operates at 1550 degrees Fahr., ordinary metallic resistors being used. The high-temperature chamber operates at 2350 degrees Fahr., this temperature being obtained by the use of a graphite resistor which extends hoizontally through the furnace. Because of the difficulty in obtaining resistors capable of withstanding temperatures higher than 2000 degrees Fahr., previous electric furnace developments for high temperature work had not proved satisfactory. During the war German chemists developed a type of quartz carbon resistor for which working temperatures of 2400 degrees were claimed but experiments conducted by the Ryan company proved these re-

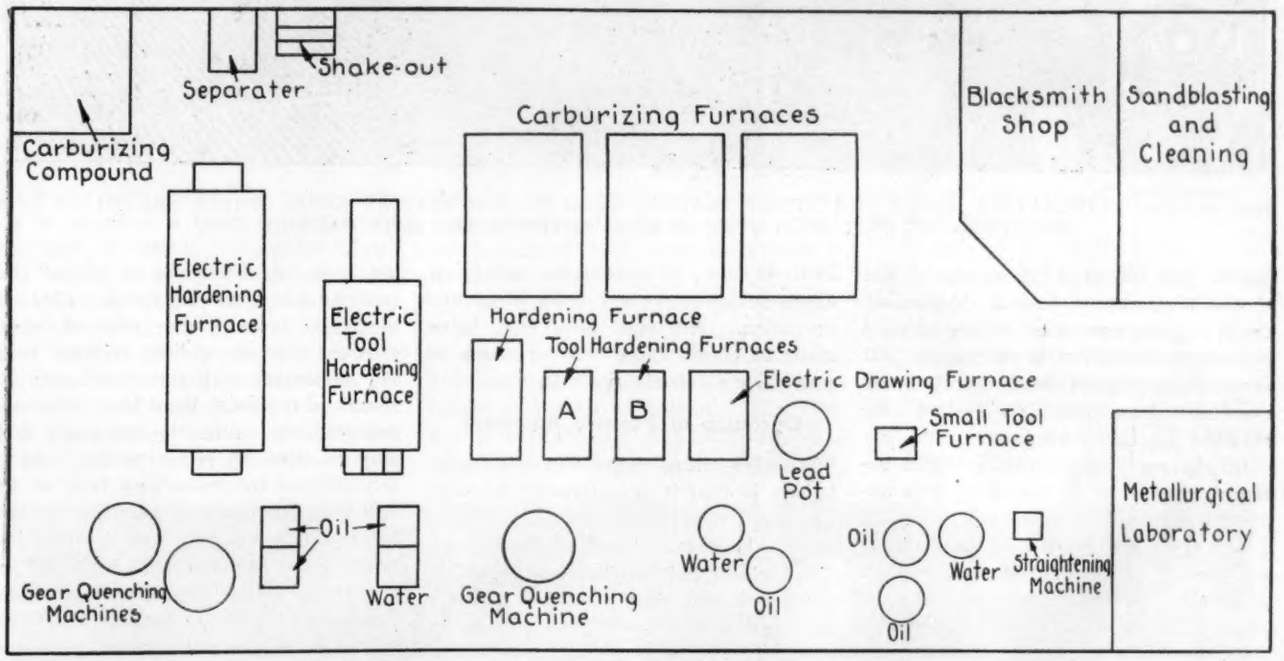


FIG. 4—THIS SHOWS THE GENERAL LAYOUT OF EQUIPMENT IN THE HEAT TREATING SHOP. THREE OF THE FURNACES ARE ELECTRIC AND HAVE AUTOMATIC CONTROL

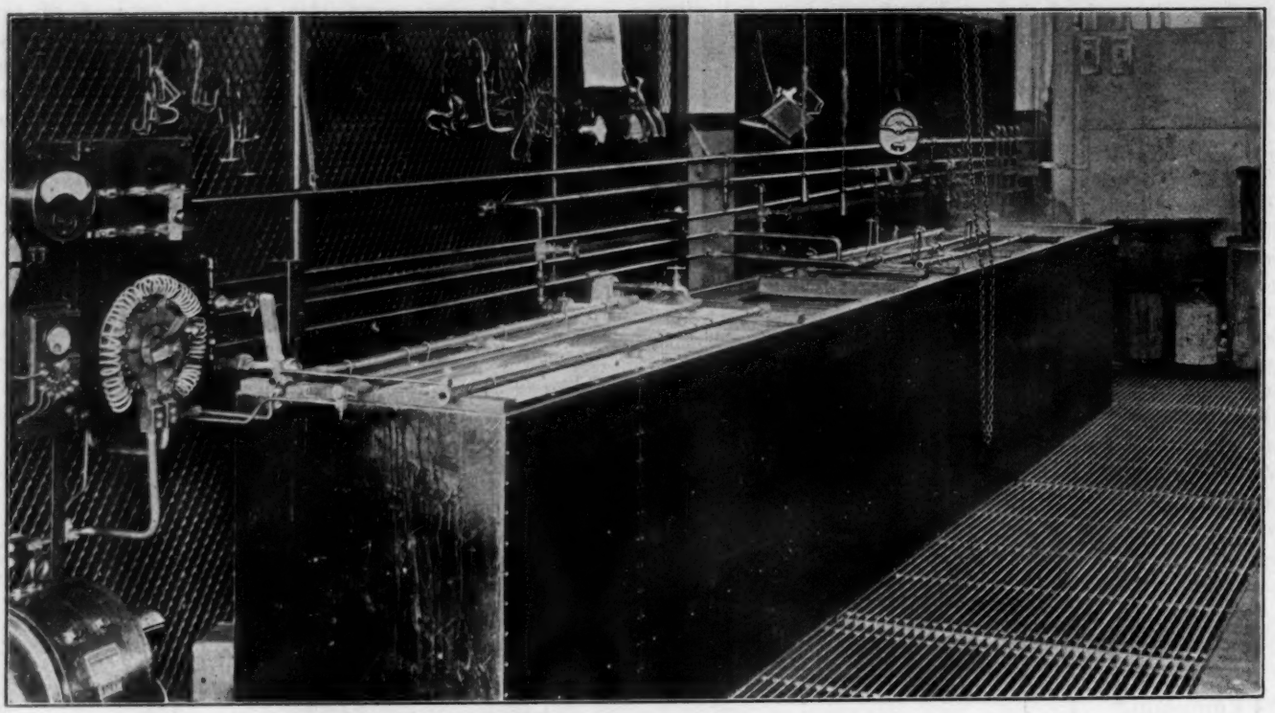


FIG. 5—THIS ILLUSTRATION SHOWS THE COPPER PLATING MACHINE FOR PLATING GEARS WHICH ARE TO BE CASE HARDENED.THE UNIT IS LOCATED IN TH E CENTER OF THE MAIN MACHINE SHOP

sistors too fragile for commercial use at the temperature desired. Attention, therefore, was turned to the use of solid graphite resistors, but it was found that these electrodes oxidized quickly and even burned out before the desired temperature had been attained.

In the early tests with graphite resistors, power of 27 kilowatts was applied but this failed to secure results. This led to the belief that to counteract the effect of oxidation, a method would have to be developed whereby the heat of the electrode could be increased instantaneously to a great many degrees higher than the possible saturation affinity of the air. Consequently a special low-voltage transformer capable of delivering 75 kilowatts through the single electrode was developed by the Wagner Electric Mfg. Co., St. Louis. The results were satisfactory for commercial use. Temperatures up to the working conditions of the furnace were reached easily and it was found that after the working temperature was reached, the power input of the transformer could be reduced to the original calculation of power input.

The furnace is so designed that as the tools are extruded into the quenching bath, the fumes are permitted to pass into the chamber, thereby acting to decrease electrode oxidation. This discovery led to the conclusion that a small amount of gas around the electrode would prevent oxidation, consequently when starting up natural gas is injected into the high-temperature chamber. The life of electrodes has been found to be 30 to 40 hours of continuous service, or about sufficient for one week of normal operation. Attempts now are being made to obtain longer life by means of protective electrode coatings.

Operation of Furnace Automatic

Another unique feature of this installations is that it is automatic in pushing work through the furnace. Fig. 2 shows the charging end of the furnace. The inclined platform built out from the furnace is the charging table which is equipped with a mechanical pusher operated by the electric motor mechanism mounted on the floor below. Tools are of a type that may be placed side by side in a row, consequently a number may be picked up at one time. In the case of the particular tool shown on the charging table just above the wooden tray, 24 are placed together in a row. To charge the furnace, the pusher is pulled back to its extreme position, a row of tools is placed in front of it and the power drive is engaged. The tools are pushed slowly into the small opening just below the large door. When the pusher approaches its extreme limit of travel a bell rings to warn the operator that a new charge is needed. Depending upon the size of the tool being hardened, the pusher has a controllable feed which may be adjusted to allow a range of from 20 to 45 minutes for work to pass through the furnace. Of this time from about 3 to 6 minutes is in the high-temperature chamber.

The discharge end of the furnace is shown in Fig. 3. A special oil quenching tank was built and so placed that tools pushed from the furnace slide immediately through the covered chute into the quenching bath without coming in contact with the outside air. By means of the small hand lever, shown in front of the chute, the quenched tools may be diverted either to the right or left side of the quenching tank at the will of the operator. Heavy wire baskets are lowered into the tank to catch the tools, these baskets being removed by means of a hand-operated chain block hoist. In the case of the tools shown being charged into the furnace, quenching is done at the rate of about 5 per minute. Approximately 3000 of these tools may be hardened per day and only one man is required to watch the furnace, charge the tools and remove the finished product. Actual operation has shown a power consumption of 4 kilowatts per pound of steel. The new electric unit replaces the two gas-fired furnaces designated as *A* and *B* in Fig. 4, these being preheating and high-temperature units, respectively. Because of the intense heat, two men working in shifts were required to charge and remove the tools. Moreover, the capacity by this method was only 2000 pieces per day.

All oil and water quenching tanks in the heat treating department were designed and built by the Gleason Works. They are of the circulating type in which the cold oil comes up from the bottom of the tank while the hot oil overflows at the top into troughs or gutters which conduct it back to the cooling tanks located in the basement. The cooling sys-

tem consists of a series of coils through which ammonia is pumped from the main power house. As it drains by gravity from the quenching tanks above, the oil trickles down over the coils and falls into the tank below. It then drains through a trap arrangement for catching any sediment into another tank which serves as a reservoir and from which a small motor-driven pump returns it to the quenching tanks. An ordinary grade of oil is used. Some of it has been in use for 14 years, having been transferred to the new plant when it was built 8 years ago. During this latter period it has not been necessary to clean out dirt or sediment from the cooling tank. From time to time an additional supply is placed in the reservoir to compensate for that which is burned up in quenching.

Fuel Oil Storage Provided

Fuel oil for the operation of the carburizing and miscellaneous furnaces is stored in three railway tank car tanks buried outside and about 150 feet from the heat treating shop. A reserve supply is stored in a large hoizontal tank mounted on supports alongside a railway switch about 100 feet away and from this tank oil may be drained into the three underground tanks. Replenishment supplies of oil, however, usually are placed in the underground tanks. In the bottom of each of the three tanks is a pump driven through a shaft and bevel gearing by electric motors housed in wooden boxes mounted on the ground above the tanks. Two of the tanks are connected together in one circuit while the third tank forms another circuit, thus in case of failure of any pump, in either circuit, the other circuit may be used. From the storage tanks the oil is pumped into a vertical tank mounted on the end side wall of the shop. It is pumped into this tank against an air cushion which maintains a pressure of 15 pounds per square inch and if this pressure is exceeded, a safety valve bypasses the excess oil back to the storage tanks without loss. As the fuel oil is consumed by the furnaces it passes from the pressure tank through steam coils and into the furnaces. By this arrangement only the oil which is consumed is preheated.

One of the striking impressions gained by a trip through the Gleason plant is the orderly condition of machines and equipment. The atmosphere is one of neatness and cleanliness. Floors are kept clean and scrubbed periodically, and all buildings are well maintained both on exterior and interior. Columns, roof trusses and ceilings in most cases are painted a light color to provide a maximum of light.

What has just been said applies equally as well to the heat treating shop as to other parts of the plant. Furnaces and auxiliary equipment have been placed according to a definite plan laid out in advance and this plan has been adhered to as additional equipment has been added. In fostering a policy of orderliness and cleanliness in their plant, company officials believe that the effect will be reflected in the quantity and quality of production. As a further step in pursuing this policy, each workman is permitted to have one overall suit washed each week at company expense and he also is provided with free bath towels at the shower baths.

British Society To Meet

A British Empire Mining and Metallurgical congress will be held in London in conjunction with the British Empire exhibition, June 3 to 6. Among the societies which will co-operate in making up the program for the congress are the British Iron and Steel institute; National Federation of Iron and Steel Manufacturers; Institute of Metals; the Mining Association of Great Britain; the Institution of Mining Engineers; and the Institution of Mining and Metallurgy. Papers will be read and discussed dealing with the mining and metallurgical resources and development of the British Empire.

The Greenfield Tap & Die Corp., Greenfield, Mass., reports for the year ended Dec. 31, 1923, net profits of $613,090 compared with $159,183 for 1922. Profit and loss surplus as of Dec. 31, 1923 was $452,415 compared with $324,198 the year before and $524,423 on December 31, 1921.

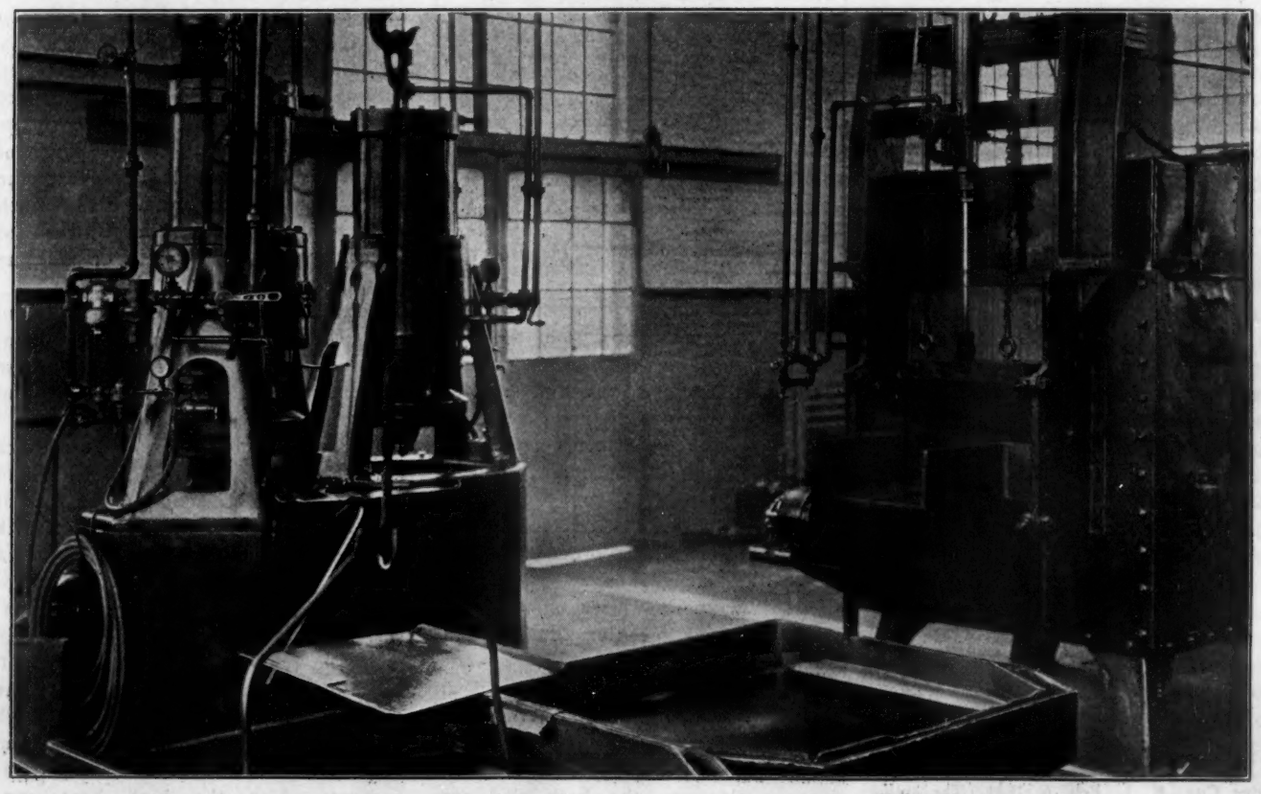


FIG. 6—THE DISCHARGE END OF THE CONTINUOUS ELECTRIC HARDENING FURNACE. AT THE LEFT ARE TWO OF THE GEAR QUENCHING MACHINES AND IN THE FOREGROUND ARE TWO OF THE CIRCULATING OIL QUENCHING TANKS

Service Affects Life of Linings

Common Operating Conditions of Basic and Acid Open-Hearth Furnaces Determine Rate of Deterioration of Refractories in Ports, Roof, Side Walls, Hearth, Slag Pockets and Regenerators

BY CHARLES A. SMITH

ACID and basic types of open-hearth furnaces are practically alike in construction except that the hearth, of necessity must be acid in the one case, and basic in the other.

Since the entire lining of the acid furnace is of the same chemical nature as the slag, which is relatively small in amount, and since no volatile fluxes are added to the charge, the life of the acid furnace is much greater than that of the basic, being frequently 1000 heats. The chief active corrosion of the acid furnace lining results from iron oxides attacking the silica hearth at the edges of the bath where greatest oxidation occurs, and from the scorifying action upon the hearth of molten metal, oxidizing as it is being melted. Steel scrap if charged on the hearth, will attack the hearth greatly in melting due to the large percentage of oxide in the scrap.

The life of the basic open-hearth lining is much less than that of the acid hearth, being rarely over 350 heats. The relatively shorter life of the basic furnace may be ascribed to the fact that a large part of the lining is of a nature chemically opposite to that of the thin, highly corrosive, basic slag, and the furnace atmosphere which is heavily laden with highly basic vapors, flux dust, and slag particles.

Ports and Flame Action

The silica roof, ports and checkers generally are the determining factors in the life of a furnace, and of the three, the ports and the roof are the most troublesome. While the customary American port design, consisting of a long narrow air port directly above a much smaller gas port, produces a fast working furnace and allows better combustion without danger of burning the port at the outgoing end, the arch forming the gas port is subjected to high temperatures by the gas on one side and the air on the other, thus affording no opportunity for cooling. These conditions produce failure of the nozzle or end of the gas port and cause the flame to be thrown upon the walls and roof of the furnace. In order to prevent the local overheating and consequent failure of brickwork resulting from this lack of flame control, water-cooled steel ports have been introduced with a fair degree of success. This type of port is of the same general form as the ordinary brick arch port and is inserted through the end of the furnace, being protected by a permanent silica brick arch closely conforming to the outer shape of the metal port. In some cases the end of the brick arch consists of magnesite brick in order to withstand the action of slag splashes, although magnesite brick spall excessively at this position due to the water cooling. The ports are so constructed that the flow of gas and air should strike the level bath at a slight angle, and the intensely hot radiant flame should pass through the furnace close to the bath and separated from the roof by a blanket of cooler air. But during the melting process the furnace is piled high with steel scrap, which forms an excellent baffle from which the flame can be deflected strongly against the roof and side walls. Due to the swirling action given the gases by the incoming air impinging sharply on the top of the gas flow, hot eddy currents are produced at the side walls opposite the "spotting" point of the flame, if the furnace is slightly narrow. This causes a heavy corrosive action in the side portion of the roof and lower side walls, in some cases necessitating the building of a roof having a 9-inch center and 12-inch sides in order to prevent the dropping of the entire roof.

Effect of Oil Fuel

Frequently while repairs are being made on parts of the gas producers of a furnace designed to burn producer gas, an oil burner is inserted through a gas port. When a furnace of this type is operated on oil, the life is often reduced about 50 per cent due to the roof being much too low for the intense heat generated by the oil flame. If the roof be raised several feet, a fast working furnace is produced by oil firing and the flame action is distributed to all parts of the furnace, instead of largely to the roof. The oil-fired furnace has a much shorter life than the gas furnace but the increased production offsets the cost of rebuilding.

Powdered coal has not been found to be desirable as a fuel in a regenerative furnace due to the immense accumulation of ash collecting in, and also fluxing the checkers.

While the acid nature of the silica roof is entirely unsuited to withstand the fluxing and scouring action of the gas, which is heavily laden with abrading and fluxing particles, silica is used because of its relative cheapness and ability to withstand the excessive temperature, which frequently is in the region of 1700 degrees Cent. Silica brick are used, due to the property of withstanding the high pressure of the flat-arched roof, up to a point close to the melting temperature. Also the high heat conductivity of the brick allows the outer

Operating Conditions Basis of Study

IN PRACTICALLY every discussion of open-hearth refractories, the point is emphasized that service conditions must be studied and thoroughly understood before the most efficient refractories can be developed. This thought has been recognized in the research work of the Refractories Manufacturers' association and has rapidly gained acceptance among the many ceramists, metallurgists, engineers and furnace operators engaged in investigating the refractories problem.

In the accompanying article, the author points out the more salient features of the deterioration of open-hearth refractories under common operating conditions. If readers interested in this subject will read first the article by Robert E. Ferguson, appearing on page 22 of the Jan. 3, 1924 issue, then the report of the recent meeting of the American Ceramic society on pages 493 and 494 of last week's issue, and finally the accompanying discussion, they will gain an unusually clear and concise conception of the principal factors entering into the problem of prolonging the life of furnace linings.

Presented at a meeting of the refractories division of the American Ceramic society, Atlantic City, N. J., Feb. 6, 1924. The author is refractories fellow, Lehigh university, Bethlehem, Pa.

portion to remain firm and rigid even if the inner portion is fused. It is common practice to use a silica roof until it is reduced to about 3 inches in thickness. On examination the iron-impregnated lower portion of a roof brick clearly shows the strong fluxing action of the iron and other basic oxides in the furnace gases.

Slagging Action on Side Walls

The silica side walls are subjected to the direct slagging action of the highly corrosive basic slag at or near the slag level in addition to the scouring and fluxing of the gases. The load carried is merely that of the wall itself, due to the weight of the roof being carried by a special steel framework built around the furnace, and the brickwork is subjected to considerable thermal shock during charging and after tapping, especially near the doors, which are then wide open and admit large amounts of cold air. For this reason, magnesite and chrome have not been very satisfactory, due to their strong tendency to spall. The direct action of the slag is great, and the lower portion of the side wall from a few inches above the slag line down, is sometimes made of a high quality chrome brick in preference to several courses of chrome separating a lower portion of magnesite from the upper portion of silica.

In the construction of 200-ton tilting furnaces for the Talbot process, the basic lining must be carried up the side walls for a considerable distance to prevent slag action on the walls during tilting. Frequently, in this type of furnace, the wall on the tapping side is made entirely of magnesite. Since much of the metal is charged molten, and, therefore, quickly charged, and since repairing the bottom takes less time due to the tilting action, the sudden cooling of the brickwork by air currents and the resultant spalling is materially reduced.

While the hearth is corroded by the slag, especially at the highly-oxidized edges of the bath, it can be and is patched after every melt, and consequently the corrosive action is less important than in other parts of the furnace. However, the hearth must be highly resistant to abrasion and mechanical shock and must be able to withstand the loads charged upon it. The structure must be dense and firm throughout the range of temperatures used in order to prevent the absorption of metal and slag, thus lowering its refractoriness.

The formation of cracks resulting from mechanical shock are highly undesirable, since they allow a passage for the metal to work down, and as a result, large sections of the bottom may work loose and allow the molten metal and slag to eat through the steel shell supporting the structure. The chief trouble with the hearth occurs in the formation of holes or depressions which may result from mechanical shock, thermal shock, or improper sintering.

The bulkheads may be termed that portion of the end of the hearth which extends up to the gas port. The service conditions are different from those on the hearth, the corrosive action of the slag itself being accompanied by the scouring and fluxing action of particles in the exit gases, and there is considerable direct flame action in addition. Material is not charged in this portion of the furnace and, therefore, the mechanical shock is not important.

The uptakes and slag pockets leading from the gas and air ports to the regenerators generally are built of silica brick, even though the gases passing through them carry highly basic particles and flux the brickwork greatly. Magnesite is not used extensively, due to spalling action resulting from the repeated heating and cooling during reversals. However, in some cases, it is used directly back of the ports in the top of the uptakes. The outgoing combustion gases may be at temperatures of from 1500 to 1650 degrees Cent., while the preheated incoming air and gas, upon reversal, are at from 1000 to 1100 degrees Cent. at the top of the uptake. Thus, the temperature, abrasion and basic fluxing action throughout the uptakes and slag pockets are great. In addition to the above reactions, the incoming gas in the gas flues is of an extremely reducing character which is of importance in the selection of a suitable refractory.

Regenerators

The regenerators are used not with the primary idea of saving heat, but with the purpose of obtaining a high flame temperature, that is, a high difference of heat potential between the combustion gases and the furnace charge. The temperatures are such that fire clay brick can be used for the checkers. The waste gases enter the regenerator at from 1300 to 1500 degrees and leave at from 400 to 600 degrees Cent. The chief requirements of the brick used as checkers are that they must absorb and give up heat readily and must not glaze In the gas checkers, brick high in iron should not be used, due to the disruptive action of the carbon deposited by the gas. Although properly designed slag pockets remove a large part of the slag and flux particles from the gases, a considerable amount of dirt collects in the checker flues. Numbers of special flue designs have been tried with varying degrees of success. In a plant in which standard 4.5 x 4.5 x 10.5-inch brick checkers had to be cleaned after 145 heats, the same chamber filled with 5½-inch vertical flues using 13.5 x 6 x 2.5-inch shapes lasted 1800 heats before cleaning and gave satisfactory heating service. The increased life was due to the shapes being laid on the 2.5-inch side and thus only this series of narrow edges was presented at the top of the checker-work for the collection of flue dust.

The service conditions obviously must be of first importance in the selection of refractories for various uses in a furnace, and many of them are definitely known, but it must be remembered that it is rather difficut to determine the exact conditions of gas composition, temperature, and fluxing by fume and small slag particles, and not much exact information of this kind is available at present.

Carbon Content Is Factor

Of the different grades of steel, high-carbon steel is least severe to the open hearth since the slag is neither as oxidizing nor is the time as long as in a low-carbon steel process. Since the melting temperature and fluidity of a steel increases with the carbon content the production of low-carbon steel requires either a furnace temperature several hundred degrees higher than the high carbon, steel process, or a much longer treatment, and greater wear and tear of the furnace results. If a charge of 75 per cent scrap and 25 per cent pig be "melted down soft," thus producing an extremely corrosive slag and a heavy oxidation of the scrap, the slag corrosion resulting is quite severe, especially in the acid hearth furnace. If an extremely active slag is not used, the time of the operation must be increased in order to remove the carbon, and the furnace wear and tear is correspondingly increased per heat.

If a large quantity of pig iron is used its quick oxidation by the ore added causes much more splashing of slag on the lining than when lower amounts of pig iron are used.

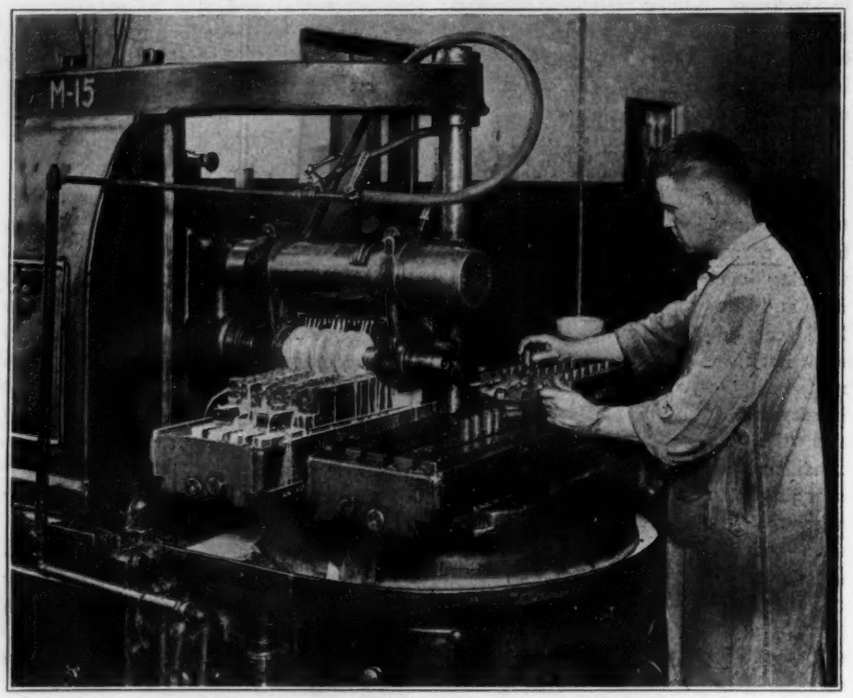
The practice of carrying at all times 0.15 per cent silicon and 0.20 to 0.40

(Concluded on Page 550)

Work Without Superintendents

Fifty-two Foremen of Massachusetts Plant, Employing 3000, Are Responsible Only to General Manager—An Experiment with Simplified System Proves Successful

BY HERBERT R. SIMONDS



The skilled machinist typifies a high type of intelligent American workman

A GROUP of manufacturers met informally one evening in a small Massachusetts town to discuss subjects which did not pertain to business. Philosophy, history and education were some of the topics. Finally one man asked another to name the greatest man in history. The unexpected reply was: "The average American."

The man who made the reply is general manager of a large manufacturing plant employing 2000 to 3000 men. In giving this answer he spoke from his heart. He has studied American workmen from many angles, and he has the utmost respect for the average man's ability. He believes that the average man in this country today has a greater power of development, a greater potential force than any average man of any other country at any time in history.

The discussion which this manufacturer started since has been extended to include the principals behind his successful plant management. He desires to remain in the background, but with this reservation he has been free to talk, and this article is the result. That his principles are not purely visionary or theoretical has been demonstrated by increased production and lowered labor turnover during more than a year of practical application.

The keynote of his plan of management is confidence in the average man. His plant at present is controlled almost entirely by average Americans, that is, by men picked from the rank and file of the plant employes.

Seek Simplification

In the matter of industrial plant organization the pendulum swings just as it does in other fields of human endeavor. For the past decade there has been a cry for plant system and a tendency to shift responsibility from the shoulders of the manager to those of an efficiency engineer. No one, of course, is opposed to efficiency, but a few managers at present are commencing to react again the "super systems" advocated by some of the efficiency experts, and it is possible that some things have been overdone in the swing of the pendulum toward elaborate systems and interlocking plant organizations. At any rate, it is interesting to follow the line of thought and the actual practice of some managers who are now pointing the way back to greater simplification.

The author is associate editor at Boston of IRON TRADE REVIEW.

Foremen Are In Charge

One of the interesting steps in this direction is found in the plant just referred to. Here all superintendents have been eliminated and 52 foremen are in control of 2500 men. These foremen are responsible to the general manager, but in actual practice they report to no one. They hire their own men and pay them whatever they like. They come and go whenever they please, remaining away from the job for days at a time if they feel that this is the best way to secure production. The one and only guide in all their work is production of good work at the right price. Providing this is satisfactory, other considerations are of no importance to the manager, and from this point of view the individual foreman has a responsibility and personal independence comparable with that of a small plant manager.

The successful operation of this system is dependent upon accurate figures covering production and cost of the articles manufactured. In this plant the product is largely the result of repetition work.

Develops Initiative

Each foreman is in charge of a unit of work which is clearly defined. The weekly accomplishment within each unit is a factor which can be represented either by figures, or on a chart. Each week accurate production and cost figures for each foreman are published. These figures give the plant manager immediate knowledge of inefficiency or laxness on the part of any foreman. Production thus becomes the watchword throughout the plant. Foreman Jones keeps at work not because he is watched by some man who happens to outrank him in the organization, but because he has in mind the weekly production of his group.

By giving a foreman complete independence within his own province he quickly acquires a feeling of responsibility, coupled with personal freedom, which combination brings out the true worth of a man. No one is giving him

orders, yet he feels he must increase his production. He is free to confer with other foremen, and this leads to co-operation within the plant. He is free to hire his men and to set the scale of pay. He may pay a man $20 a day, when the usual rate is $6, but to keep production cost down, this man will have to accomplish more than three times as much as the average $6 man.

Brings Closer Contact

At first thought this freedom and independence given the foremen would seem to remove them from contact with the management, but actually the effect is in the opposite direction. The foreman's job is a unique one. He is virtually left without a boss and at first has an inclination to take advantage of this by playing "hooky." He soon learns, however, that lack of attention to his work means low production, and that low production has an uncanny way of coming immediately to the manager's attention.

The records of production "become a sort of substitute superintendent," but unlike many superintendents they tend to stimulate rather than subdue initiative. The foreman sees that he has an independent job. He has certain work to do and it is natural for him to keep production uppermost in his mind. He is led by a desire to better his department records.

At first this plan was adopted as an experiment, but the surprises have all come in the right direction. Men have been found to develop character and responsibility quickly. As the foreman are free to come and go as they choose, they are often seen in groups of three or four at different parts of the plant. This is in direct opposition to the former theory that such gatherings would develop into social affairs, to the detriment of the work.

Tends to Better Output

Their manager says: "Suppose they do talk of football or some other topics, isn't this often what plant managers do when they meet at luncheon? It all tends to bring about closer teamwork of the plant personnel. It is surprising how quickly a tendency to co-operate springs up among the foremen. In their gathering they are sure to devote part of their time to the problems of their work and in this way they find out methods of helping one another to increase production. If a more direct routing of material suggests a saving of time and resultant better production, three or four foremen in charge of the departments affected will get together, outline the general change, and if it doesn't involve too great an expense will put it into effect without going to higher authority."

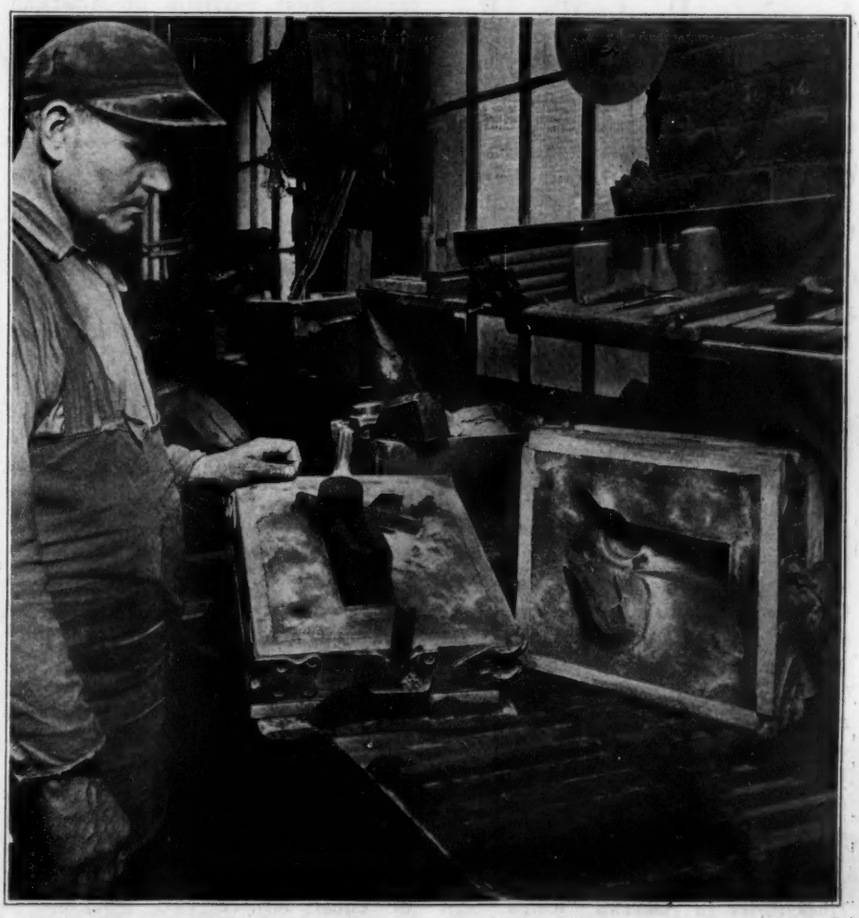
However, each foreman is given to understand that he can go to the manager at any time and in any connection with any matter. The manager's job requires some tact and generalship for difficulties are apt to arise. Once two foremen got into an argument with each other and took their troubles to the general manager. He listened to the respective stories and then told them quietly but firmly that it was a difficulty which they as men should be able to settle between themselves. He said he refused to take part except to repeat his admonition that production must not suffer. If, failing to settle the difficulty, it was permitted to hamper production, they would both leave. Making no change whatever he sent the two men back to the shops and never heard of the difficulty again.

Labor Difficulties Avoided

With each foreman a virtual manager, establishing the pay of his own men, no uniform rates exist and labor trouble is almost entirely avoided. The plant, practically speaking, "belongs" to the foremen. Left to themselves they will create within their own ranks an organization. They will hold meetings. The more progressive ones will tell the others of new and better ways of working. Clubs or social groups will develop. As soon as it is generally understood that all the management wants is production with low cost and good quality, the foreman seem to take the job upon themselves, as much as to say: "The manager doesn't seem to pay much attention to this plant and so it is up to us to work the thing out for ourselves." The manager has said that he has practically worked himself out of a job by turning the plant over to his foremen.

Unusual Plant Required

It must be admitted that an unusual type of plant is necessary to have the plan work out satisfactorily. Production must be fairly well standardized so that changes in size and design are seldom made. The production must be fairly uniform throughout the year to afford means of comparing production from week to week. Production processes must lend themselves to a natural division into units so that each foreman will have a well defined job to look after. His job may consist merely in grinding one surface of the article being produced, but he must know that this is his work, that the surface ground will pass through an inspector's hands, and that the number of pieces ground by his men will be accurately checked



THIS FOREIGN-BORN AMERICAN WAS QUICK TO LEARN THE MOLDER'S ART

A GERMAN AND AN ITALIAN WORK EFFICIENTLY SIDE BY SIDE

and listed each day. The system of recording production and production costs must be thoroughly reliable.

American Production Far Ahead of British

Since his invention of manganese steel Sir Robert Hadfield has presented 139 papers to scientific societies in Great Britain and other countries. Sir Robert recently delivered an address before the Birmingham University Metallurgical society and has since expanded the paper into a booklet of 80 pages entitled "The History and Progress of Metallurgical Science." The booklet contains considerable historical matter, is illustrated with photographs of eminent inventors and men of science.

The author has much to say about America, and in connection with the progress in the iron trade, compares the latest modern production with that of Great Britain 100 years ago. In 1827 the 284 British furnaces produced 690,000 tons of pig iron. Since in America many furnaces produce 300,000 tons annually, Sir Robert points out that two of these would now turn out almost as much as all of the British furnaces 100 years ago. Statistics are given as to the gigantic present-day production of America.

Discussing research, Sir Robert calls attention to the existence of over 500 laboratories in America "which helps to bring home the excellent way in which the United States is going ahead in this respect." The laboratories of the General Electric Co. and of the Du Pont Co. are cited as some of the finest examples of American laboratories. The latest example is the erection of a new building at Washington for the National Academy of Science by the national research council at a cost of about $1,350,000.

Service Affects Life of Linings

(*Concluded from Page* 547)

per cent manganese as residual silicon and manganese in the bath in order to keep oxygen out of the final steel, removes the oxidizing layer of the bath between the metal proper and the slag and thus materially decreases the corrosive action at the shallow edges of the bath.

In the final analysis, the refractory which is most desirable from the steelmaker's point of view is that which will enable him to produce steel at the lowest furnace cost per ton. If by frequent renewals of lining at a fairly low price, a fast working furnace will produce sufficient tonnage to offset the cost of new linings, that operation is satisfactory. If a higher priced refractory will permit the furnace production to be sufficiently increased to result in a lower or equal furnace cost per ton of steel, that refractory is most desirable.

In conclusion the author wishes to acknowledge and express his appreciation of the aid in obtaining information given him by W. H. Kelley, refractories engineer of the Bethlehem Steel Co., and by Prof. Bradley Stoughton, professor of metallurgy at Lehigh university.

Open Safety Museum

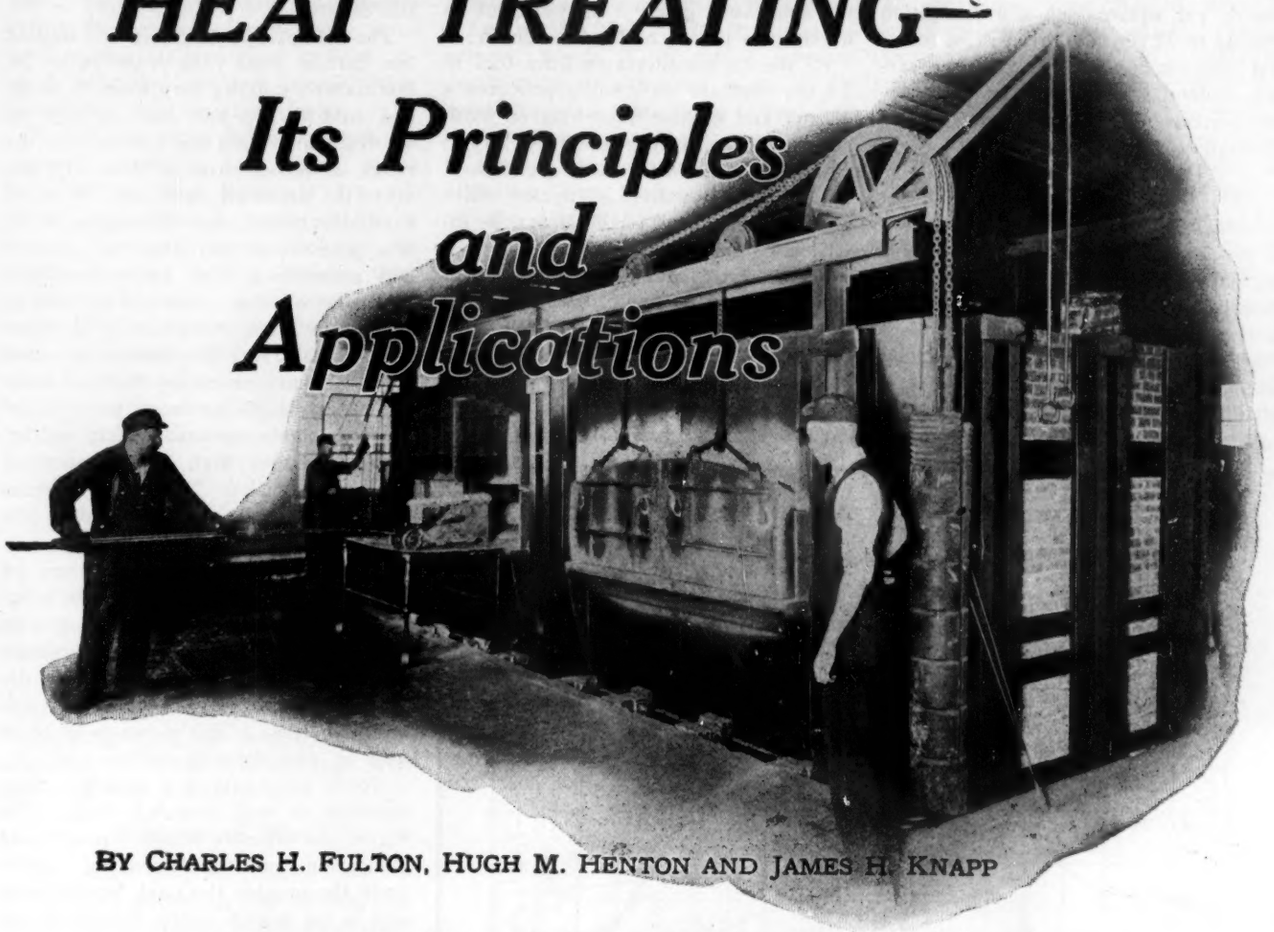
The new American Museum of Safety, 120 East Twenty-eighth street, New York, formally was opened Jan. 30. Many of the leading figures identified with the safety movement in this country as well as executives of many large corporations were present. These included Charles L. Close, manager of the department of safety, sanitation and welfare, United States Steel Corp., who holds the most important industrial safety post in this country. It was announced by Arthur Williams, president of the museum that the institution would be conducted in co-operation with the New York state department of labor but that it would continue to function as a national institution where employers from all sections of the country may acquaint themselves with the best known means of safeguarding the life and health of their workers, not only through mechanical devices, but also through education. Mr. Williams pointed out that 20,000 men and women still are being killed annually and that more than half a million are being seriously injured each year, in industrial operations so that there is opportunity for much more intensive safety work.

Publish Tentative Standard

Subcommittee No. 2 of the sectional committee on standardization of bolt, nut and rivet proportions, which was organized by the Society of Automotive Engineers and the American Society of Mechanical Engineers acting as joint sponsors, has returned a tentative report of their findings. This report has been published and is being distributed to enable the subcommittee to have the advantage of comment and criticism of all interested users before the final report is drafted. Copies of the tentative report may be obtained from C. B. LePage, American Society of Mechanical Engineers, 29 West Thirty-ninth street, New York.

Clarence J. Matthews and C. J. Mitchell have been appointed receivers for the May Foundry Co., Sixty-first street and Eastwick avenue, Philadelphia. The company is solvent, according to reports, but was unable to liquidate assets to meet maturing obligations.

HEAT TREATING—
Its Principles and Applications



BY CHARLES H. FULTON, HUGH M. HENTON AND JAMES H. KNAPP

Chapter V—Normalizing and Annealing (Continued)

THE structure of all steels, in either the normal or annealed state, may be interpreted in terms of physical properties. In Fig. 38, for instance, the physical properties most commonly used in testing work are plotted for a 0.26 per cent carbon cast steel specimen similar to that from which the micrographs shown in Figs. 34, 35, 36 and 37 were made. The elastic limit, ultimate tensile strength, and per cent of elongation in 2 inches are indicated at the progressively higher temperatures used in normalizing. The grain size is approximately indicated in a relative manner.

At temperature below the critical point, the cast steel in the form of half-inch cubes has a grain size of about 0.001 square millimeter, a tensile strength of 54,000, an elastic limit of 20,000 and an elongation of 13 per cent. This steel should give a fair idea of the effect of grain size upon these physical properties because it is so low in carbon that no appreciable hardening should occur with air-cooling. Air-cooling prevailed in all cases plotted in Fig. 38.

No great change is apparent at 750 degrees Cent. (1382)*, but a slight rise in the values of the physical properties is noticeable and the grain size has declined to about 0.00085 square millimeter. At 800 degrees Cent. (1472) the grain size has shrunk to 0.0007 square millimeter and an abrupt jump in elongation and ultimate strength has taken place, soon to be followed by an increase in the elastic limit. From 800 to 850 degrees Cent. (1472-1562) the values of the three properties increase rapidly, while the grain size falls to 0.0005 square millimeter. From 850 to 950 degrees Cent. (1562-1742) the gain in elongation and ultimate tensile stress continues, but more slowly. The elastic limit reaches its maximum at about 900 degrees Cent. (1652), at which temperature the grain size is 0.0001 square millimeter.

Beyond 900 degrees Cent. the grain size begins to increase at about the same ratio to temperature with which it decreased in the range below 900. The elastic limit drops, and soon after the values of the other properties decrease, so that further elevating of the temperature above 950 degrees Cent. (1752) does not accomplish normalizing but simply causes the structure to revert to the cast condition.

Normalizing at 900 degrees Cent. (1652) has caused a drop in grain size to one-tenth of the original size, has raised the elastic limit from 20,000 to 50,000 pounds per square inch, the ten-

*Figures in parenthesis represent temperature in degrees Fahr.

Influence of Size on Annealing Time

WHILE laboratory samples may give a good basis for studying the principles of normalizing and annealing, they are of little help in determining the treatment required for heavy sections. Therefore the discussion in the accompanying installment on the influence of size on annealing time is of practical value.

Chapter I of the series appeared Oct. 4; Chapter II was published in the issues of Oct. 18, Nov. 1 and Nov. 15; Chapter III in the issues of Nov. 29, Dec. 13 and Dec. 27; and Chapter IV in the issue of Jan. 10. Chapter V has appeared in the Jan. 24 and Feb. 7 issues.

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sile ultimate from 54,000 to 75,000 pounds per square inch and elongation from 13 to 30 per cent. It will be found that each cast steel, of whatever carbon content, will act in a similar manner, effects of partial hardening being eliminated from the study.

Effect of Annealing

Annealing does not show parallel effects. The elastic limit and tensile strength rise to nearly parallel values, though considerably lower, but elongation rises only slightly before it falls away with increased temperature of annealing. It is evident that the loss of ductility in 0.26 carbon steel occurs because of the larger grain growth during slow cooling. Air-cooling is fast enough to catch the grain in the smaller size, giving the higher ductility.

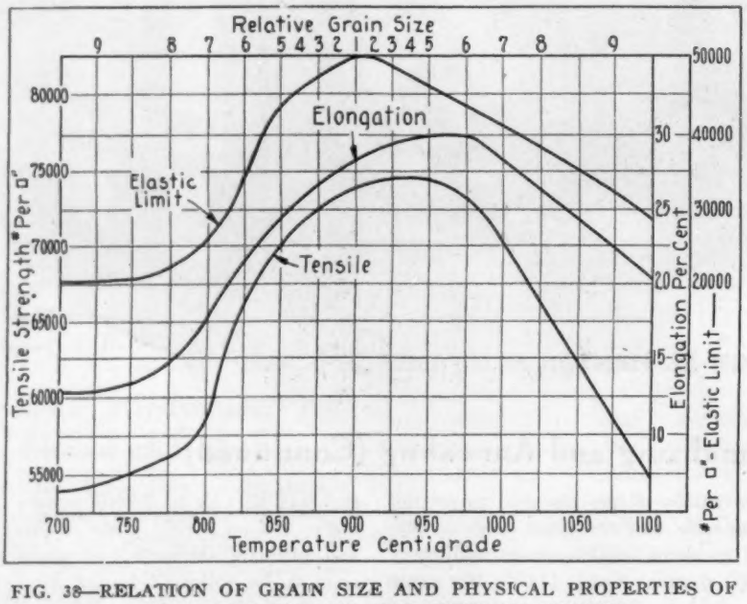

FIG. 38—RELATION OF GRAIN SIZE AND PHYSICAL PROPERTIES OF 0.26 PER CENT CARBON CAST STEEL TO NORMALIZING TEMPERATURES

The ductility in terms of elongation, and tensile strength, can be calculated theoretically for well annealed steel from the following values: The tensile strength of pearlite is 110,000, of ferrite 40,000 and of cementite 10,000 pounds. The ductility of pearlite is 10 per cent, of ferrite 50 per cent and of cementite 0. However, sorbite and grain size enter into the combination, and affect the figure actually obtained, as does the relative position of the constituents. The sorbite of very low carbon content has a ductility which approaches that of small grained ferrite, and slightly higher tensile strength. When it contains more than 0.50 per cent carbon, sorbite is much stronger than pearlite, and somewhat more ductile, so pieces or rods of small section and wire for cables frequently reach a strength of 300,000 pounds per square inch, due partly to the cold work given it by virtue of its ductility in the normalized condition.

As the carbon increases from 0.25 to 1.8 per cent the air-cooling produces a greater and greater quenching or hardening, whch becomes acute on hypereutectoid steels with small sections. A variation in properties is effected which departs further and further from the interpolated values as calculated from per cents of ferrite and pearlite, or cementite and pearlite. For instance, consider a 0.60 per cent carbon steel. With the eutectoid placed at 0.90 per cent, in a well annealed sample we have 2/3 pearlite and 1/3 ferrite. For tensile strength: (2/3 of 120,000)+ (1/3 of 40,000)= 93,333 pounds. For ductility (2/3 of 10) + (1/3 of 50)=23 1/3 per cent in 2 inches.

Actually such a steel with normal amount of impurities will have 95,000 pounds to 105,000 pounds tensile strength if well annealed and about 20 per cent elongation, depending on the amount of previous hot work done to reduce imperfections present in the original cast ingot. Some sorbite, or a slight change in manganese content, or something or that sort, readily gives an improvement in one direction, sometimes in several. Brinell hardness gives a good indication of ultimate tensile strength.

If we take a steel of 0.60 carbon, 0.22 manganese and 0.02 per cent phosphorus and figure the ultimate strength according to Campbell's formula we obtain 111,600 pounds per square inch. Evidently his formula takes into account some sorbite, and does not depend upon steel annealed to pearlite and ferrite.

The scleroscope hardness in annealed low carbon steel runs from 16 to 24. Normalized samples vary from 20 to 30, and cold-worked ones run as high as 40, depending upon the carbon. In the range of carbon from 0.90 to 1.80 per cent, the annealed steels are 28 to 40 hard, normalized ones running up to 45. The scleroscope hardness in annealed and normalized, high carbon and low carbon steels, has a certain relation to the elastic limit. Staring at 16 hardness, a plain very low carbon annealed steel will have an elastic limit of about 15,000, while 80 hardness gives about 150,000 pounds per square inch, and belongs to a very high carbon quenched steel, not annealed. The elastic limit for the last example annealed would be about 55,000 with a hardness of 37.

Ductility does not mean softness by any means, but a rough idea of the progress of the annealing operation can be gained from the scleroscope hardness. As the hardness increases ductility decreases in some measure, but very soft ferrite in large grains is too weak to be used in wire-drawing cold.

Notch toughness is a general characteristic of well annealed steels. The higher the ultimate tensile strength and elongation, and the lower the elastic limit, the tougher the steel, but for good reason the higher elastic limit with the same elongation gives the better test in the notched bar. The miscroscopic arrangement of constituents bears a decided influence on notch toughness. A ferrite versus pearlite boundary in cast steel, unannealed, is much like a miniature notch. A normalized steel has the best apparent microstructure, but a limit soon is reached where the higher carbon steel show a falling off of the ultimate strength and elongation, and notch toughness is low even though the elastic limit is high.

Annealed materials do not resist abrasion or shear well. Sorbite in the normalized steels is little better, leaving this field to the hardened and tempered steels. Shrinkage and warping due to heat are not found to occur after cooling in annealed finished products.

Fatigue as a Factor

Electric conductivity and permeability are greatest in well annealed *low carbon* steels. A little cold work, even such as shearing thin sheets for transformers, lowers the values greatly. Air-cooling also causes a lowering.

Springiness, resistance to bending and fatigue are greatest in sorbite steel, generally produced by the double treatment. If fatigue occurs only from stresses in excess of the elastic limit, then annealed material would

be the best and take the most cold work, but the consensus of opinion seems to be that fatigue may proceed to final failure from rapidly applied whipping stresses considerably below the yield point at least.

In all properties which pertain to cupping, spinning, or sheet metal working, annealed materials are superior and efficient work entails a certain strength which belongs to small, equiaxed grains rather than large, overworked ones. The purer steels of low carbon content are the ones used most. The retarding effect of the deformed pearlite upon equiaxing ferrite becomes increasingly manifest as carbon increases, and low temperature anneals are then less efficient.

Ingotism in large sections of cast steel presents itself often for solution by annealing. The figures of the original dendritic forms can be etched and then examined readily by the naked eye. If this structure is not readily completely removed, it can at least be modified by a very high heat for a short time, followed by a lower heat just above the critical range with quick cooling between.

Influence of Size

The large size of many articles which need annealing and normalizing brings up a question which ever takes the keenest judgment of the steel treater. Though we may study the iron-carbon diagram, find out what treatment is feasible, and prove it by treating the half-inch laboratory samples, how are we to heat through, and cool through, a 4 or 5-inch billet or shape? What manner of quenching will give an effect to a 12-inch cube equivalent to air-cooling for a half-inch one?

As far as 0.26 per cent carbon cast steel is concerned we will attempt to show by means of Fig. 39 the time variations necessary in heating and holding to get the grain refinement, also the limit allowable in time for cooling to normalized structure, and likewise with annealing. The diameters are given in inches, and time in hours. From what we have learned for the half-inch cubes, it is a question of a certain maximum time allowable in cooling through the critical range which gives us, for instance, the well normalized partly sorbitic structure. This time for 0.26 per cent carbon steel is about 15 minutes but can be stretched to about 25 minutes in case of an 8-inch section because of the harsher cooling necessary on the outside of the latter to bring down the temperature of the center fast enough for sorbite and ferrite in anything like a fine grain.

Let us go back to the heating operation, which is the same whether normalizing or annealing is to be accomplished. Heating in a furnace of ample capacity should be accomplished in about 15 minutes for every inch of diameter. The heating time depends on the temperature of the furnace. Fig. 39 shows the time required to bring the temperature of a one-inch cube to the point necessary, assuming the furnace temperature is correct and the furnace chamber is properly proportioned to the work.

From Fig. 39 it will be noted that while only 60 minutes are required to heat a 4-inch cube to the proper temperature in a properly designed furnace, the piece must be held 2 hours at that temperature to effect the desired change in structure. Where accurate results are desired the furnace temperature must be carried only slightly above that desired in the piece. This prevents any danger of overheating. It will be seen that the rough figure for heating time already given is approximately correct. As the heat conductivity of steel is great enough and the specific heat small enough, the inside of any pieces will come to the annealing temperature without injury to the outside if this time is allowed.

The holding time, from Fig. 39, is seen to be about twice the heating time for any particular diameter. This means a half hour per inch of section. To some this may seem too long, but ordinarily the temperature of the piece being treated must be measured from the outside, and a long time is required to equalize the temperature at the center with that on the surface when the gradient becomes small. The transformation of ferrite grains into the austenite solution takes a great amount of energy, and energy transfer from out to in is slow when difference in energy potential (temperature gradient) is slight. When a temperature balance is obtained, then we have ideally yet to accomplish in a large mass, say 512 cubic inches for the 8-inch cube, what took 15 minutes at least in half-inch cube, containing ⅛ of a cubic inch. With all possible allowance, we can never get as small a grain in the large sizes. The temperature gradients which exist in the beginning place some grains in an active growing condition while others are partly dormant, and easily absorbed.* Hence the germinant grains grow large until equilibrium is finally established, and a difference in grain size exists way up in the austenite region before any attempt at cooling is made. Some advocate an increase in temperature of the furnace to decrease time, (See Fig. 39) but when the proper temperature has been determined a further increase is only justified by such an emergency as lack of capacity or rather the lack of heat units the furnace can furnish at the lower temperature.

After holding the correct time at

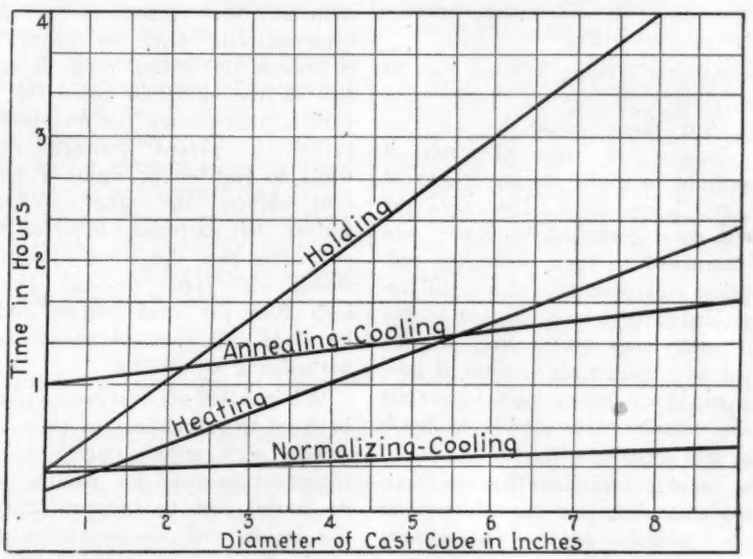

FIG. 39—INFLUENCE OF SIZE TO ANNEALING TIME

NOTE: Bars take twice and sheets three times the time required for cubes, the smallest dimension being the same in all cases.

*Jeffries, *Bulletin* A. I. M. E., June, 1918.

the maximum temperature, cooling for annealing of 0.26 per cent carbon steel should be rapid enough to give pearlite well defined at 500 diameters, and no sorbite. The time allowable is shown in Fig. 39. The graph is very flat, giving but the slightest increase in time with size. Our contention that 1 2/3 hours are sufficient for a 9-inch cube is confirmed by Law in his cooling of 18-inch, 0.34 per cent carbon masses.* He found the steel pearlitic even after an oil quench which cooled it in 2 1/3 hours. Longer time could not be allowed in low carbon steels because of grain growth in the Ar_3 region. This marks quite a change, when the half-inch piece had to be furnace-cooled, and the structure even then showed much better annealing for the latter, because of its smaller grain.

Normalizing cooling follows Fig. 39 quite closely as far as 9-inch material, but there would be no further increase in time allowable if we attempt to carry on the treatment with still larger sizes. Law says the 18-inch cube quenched in water was only hardened on the outside, the center being still pearlite. There still remains iced brine quenching, but in any event such large pieces had best be treated to a hardening process if possible, and then drawn back to sorbite on the outside or as deeply as hardening had penetrated.

The double treatment has its limitations with size, just like the simpler process, because cracking of corners or of an outside ring. Severely quenched material should always be removed from the quenching bath before it reaches room temperature. Below 100 degrees Cent. (212) a great strain begins to be manifest in the most exposed parts, and no useful purpose is served by any cooling below 150 degrees Cent. (302) except that an outside cooled below might sooner cause a center to cool.

Cooling of an extensive supply of the medium employed for the quenching should be provided for, as large numbers of large articles may so alter the temperature of a non-circulating bath as to cut down the hardening effect for grain refining of the succeeding large pieces entering. Small articles, as can be ascertained from Fig. 39, need no very harsh treatment. Double treatment for normalizing springs, consists in quenching sections not exceeding one-inch thickness in oil hot enough so the material is treated clear through to the troostite condition. Then the drawing heat gives a removal of the troostite structure and the substitution of the normal sorbite. Spring steel containing 0.50 per cent carbon is quenched from 850 degrees Cent. (1562) after an hour per inch of thickness* for holding time, in crude oil, then drawn back at 475 degrees Cent. (887).

Ample capacity for cooling as well as for heating being a necessity, much variation in heating time and cooling time can and must be made as carbon content rises. If a 0.9 per cent carbon drill steel of one-inch diameter be cooled in the furnace according to Fig. 39, after heating 15 minutes and holding 30 minutes at 775 degrees Cent. (1426) and takes about an hour to cool, it will possibly be finer grained than any low carbon or any greatly hyper-eutectoid steel *air-cooled.* This is because the critical range is so narrow at the eutectoid point that even with furnace-cooling the transformation period is passed through rapidly; while to the left or right of 0.90 per cent carbon, the range so rapidly widens that extremely hypo or hyper-eutectoids pass the transformation but slowly with faster cooling. The one-inch 0.90 per cent carbon rod can be made still finer, of course, by the normalizing air-cooling.

A 9-inch 0.90 per cent carbon piece will be hard to normalize (in plain carbon steels) with either single or double treatment because the outside has to be cooled fast to conduct heat from the inside, and too severe a quench cracks the former. Hot oil baths will do the work but ample heat capacity demands that at least 100 times the volume of the piece quenched shall equal the volume of oil used. If the structure shows at all troostitic, the steel must be drawn back to the sorbitic condition by a reheat to no over 600 degrees Cent. (1112). Aside from the liability to crack, large sizes of near eutectoid steels will be found easier than large sizes of other steels, to anneal or normalize to small grains.

The magnitude of the problem of treating large forgings, guns for instance, will at once strike us. Law in quenching his 18-inch cubes in water obtained martensite only on the outside while the center was pronouncedly pearlitic; no other cooling tried gave anything but pearlite all through. Also, in reading the micrographs he gives, one can't help but notice a tendency to larger grain in the water-quenched and sprinkled than in oil-quenched samples. This no doubt was due to the great temperature gradient between outside and center. The exact grain count is not available, but the relative size of the old austenite grains can be traced through the network of ferrite.

*E. F. Law, *Journal*, Iron and Steel Institute, May, 1918.

*See Fig. 39.

Recommend Standards for Hot Water Tanks

Manufacturers of hot water storage tanks, at a recent meeting held at Washington, submitted to the division of simplified practice of the United States department of commerce tentative recommendations covering sizes and dimensions of these commodities. These recommendations, if generally adopted by manufacturers, distributors and users of tanks, will represent a reduction from over 250 varieties as now made to five standard sizes and two working pressures. The dimensions of tanks recommended for manufacture are as follows:

Length in feet	Diameter in inches	Capacities in United States gallons
5	30	180
6	36	315
7	42	500
10	42	720
14	42	1000

The tanks are to be made with two working pressures, namely 65 and 100 pounds per square inch, and are to be interchangeable for either horizontal or vertical installations. Each tank is to have five tappings, all of the same size and using standard threads. Manholes are to be standard size, 11 x 15 inches, and of pressed steel. In tanks of 30 inches in diameter, the manhole must be in the head. The hand hole is to be 4 x 6 inches with a cast iron cover. The hand hole may be located as desired.

Coils for either horizontal or vertical installations of these tanks are to be as follows:

Tank dimensions Feet	Inches	Size of pipe diameter in inches	Lineal feet of pipe
5	30	1¼	14
6	36	1½	18
7	42	1½	22
10	42	1½	34
14	42	1½	50

In certain installations where greater capacity is desired, it is recommended that two or more tanks of appropriate size be used. It is believed that the reduction in stocks of large size sheets and plates together with other economies resulting in the manufacture of these simplified sizes will more than offset the cost of additional piping where two or more tanks are used.

These tentative recommendations are to be put before all interested groups for consideration with the view of securing their adoption at a general conference to be held at the department of commerce at some future date.

Alloying Nickel with Cast Iron

Studies of Results Obtained by Additions of Nickel in Varying Percentages Are Offered—Hardness Increased and Grain Structure Made More Dense

BY PAUL D. MERICA

INTEREST of foundrymen producing gray iron castings has centered on the apparently paradoxical requirements of demands which certain castings must meet. Increased strength is sought without decreasing machineability. In the accompanying article Paul D. Merica, physical research department, International Nickel Co., Bayonne, N. J., offers some observations relative to the effect of nickel additions and advises how these should be made and what results may be expected. Dr. Merica, through his intimate association with this work and in the light of his former experience with the bureau of standards comments upon the possibilities and limitations of the nickel-iron alloys.

NICKEL was found useful as an alloying element in steel as far back as 1885, but its use in cast iron has been slow and is of comparatively recent origin. Of course, this has been due partly to the cheapness of cast iron. It was not thought that it could bear the cost of nickel addition, but it has been due also to the lack of knowledge among foundrymen about its effect on iron.

Today, cast iron is emancipating itself from its accepted role of poor cousin to steel, and much more care and attention, and what is more significant, expense, is devoted to its manufacture. It is not considered uneconomical today to use the electric furnace for iron for certain special purposes. Also, foundries do not consider chemical and physical control methods, an unwarranted expense, although they were considered highly extravagant some years ago.

Development of this subject has not proceeded to the point where all possible applications of nickel in cast iron can be foreseen. The International Nickel Co. is studying the matter, in its laboratories and it is hoped that through these investigations more light ultimately may be shed upon the matter. It is a complicated problem; the effect of nickel on iron depends upon the presence and amounts of other elements, upon the form of the carbon and other factors.

Reports on this subject by several investigators* have agreed in some statements and disagreed in others. However, from a consideration of their results as well as of the experience of the International Nickel Co. and of others who have been engaged practically in the production of nickel cast iron the following statements are warranted.

The presence of nickel in cast iron causes increased graphitic carbon formation; i. e., nickel tends, as does silicon, to gray the iron. This effect is quite definite but fairly mild; 1 per cent of nickel being equal perhaps roughly to from ¼ to 1 per cent of silicon in this respect.

The nickel does not form carbides, but dissolves in the ferrite of the iron. If the composition is such that combined carbon is present in the castings, this will be fine in structure in the presence of from 1 to 5 per cent nickel, and more resembling sorbite than pearlite, and in consequence harder.

Therefore, it will be seen that nickel exercises two effects quite opposite in nature, by lowering the combined carbon it softens the iron, but by sorbitizing the pearlite matrix of the iron, it hardens it. Which of these will prevail depends largely on the amount of combined carbon. If this is low in the composition of iron under consideration; i. e., if the iron is soft and open the nickel will soften it still further. If it is high, from 0.3 to 0.8 per cent, the hardening effect will predominate, as in fact it generally does in practice.

What has been said explains partly the disagreement of different investigators in commenting upon the effect of nickel on the mechanical properties of cast iron, and indicates also the difficulty of making general statements concerning it. The effect on mechanical properties gained by the addition of nickel, will depend upon the type of iron used; the latter may be hardened or softened, strengthened or weakened.

Grades of gray iron carrying from 0.50 to 0.85 per cent of combined carbon in general will be hardened, strengthened and toughened by the addition of from 1 to 5 per cent of nickel. Increases of from 15 to 40 per cent in hardness and in bending or compressive strength are thus obtained. The use of nickel often is beneficial, particularly in thin sections, in that good values of hardness may be obtained without incurring the risk of obtaining chilled or mottled iron or hard spots. The hardness obtained in gray iron by nickel additions is not due to an increase in the amount of carbide present, as it is when obtained by lowering the silicon content, with consequent attendant machining difficulties, but is due to the superior and finer form of the pearlite or carbide in the presence of nickel.

The effect of nickel may be illustrated by the records of tests of two sets of two heats each of iron, similar except for the presence of nickel. These tests are summarized in the accompanying table.

It is interesting to note that the ⅛-inch bars of melt No. 2 were mottled and brittle yet not as hard as the perfectly gray bars of melt No. 3 containing nickel.

The effect of the addition of from 1 to 5 per cent of nickel on the fluidity and the shrinkage of cast iron appears to be so slight as to be unappreciable. However, the addition of nickel appears to produce finer grain castings particularly in thin sections. The resistance to corrosion of nickel-bearing cast iron is somewhat superior to that of similar iron without nickel, but probably not sufficient to warrant its use generally to increase corrosion resistance. On the other hand, the resistance to oxidation at high temperatures is increased by the addition of nickel and some efforts have been made to utilize this feature in a practical manner.

When nickel is used in connection with chromium, the combined effect of the two elements depends upon their relative amounts, but generally is in the direction of hardening and strengthening the iron and increasing its chilling power. Dr. Moldenke has made a study* of the effect of one particular combina-

*Piwowarsky and Eberfeld, Stahl und Eisen V 43 P 967; 1923.
Bauer and Piwowarsky, Stahl und Eisen V 40 P 1300; 1920.
J. E. Johnson Jr., Principles, Operations and Products of Blast Furnace; 1918.
W. H. Hatfield, Cast Iron in Light of Recent Research, 1918.
R. Moldenke, Principles of Iron Founding, 1917.
L. Guillet, Comptes Rendus, V 145 P 552, 1907.

*Paper before the American Institute of Mining and Metallurgical Engineers, February, 1922.

tion of nickel and chromium found in a commercial pig iron made by the Bethlehem Steel Co., Bethlehem, Pa.

Nickel may be added either in the cupola or in the ladle. For the former purpose, nickel shot may be used, but it should be coarse, probably not under ¼ inch. A preferable form is that of 25-pound blocks which will not fall through the charge as shot will do. Amounts of nickel up to 5 per cent may be added in the ladle and readily absorbed. In this case finer shot is desirable, probably such as will pass a ¼-inch screen and this should be fed gradually into the stream of hot metal from the cupola spout.

More recently the International Nickel Co. has developed a grade of nickel shot for this purpose having a reduced melting point, which in consequence dissolves more quickly in the ladle metal.

If an electric furnace is used, the nickel may be included in the charge in the usual manner—using shot or blocks.

Effects of Nickel Additions

Melt	Per cent nickel	Per cent total carbon	Per cent combined carbon	Per cent silicon	Per cent manganese	Per cent sulphur	Per cent phosphorus	Brinell hardness 3000 kg.	Transverse strength in pounds	Deflect'n in inches	
8	3.7	3.63	0.45	1.45	0.58	0.032	0.09	192	3270(1)	0.126	(Arbitration bars
9		3.93	0.83	1.45	0.68	0.031	0.13	159	2690	0.146	(1¼" rd.
2		3.70	2.30	1.37	0.65	0.021	0.22	315	125(2)	0.090	(½" x
3	4.5	3.65	0.60	1.24	0.68	0.023	0.19	350	219	0.198	(¾"
											(flat bar

(1) 12" centers.
(2) 6" centers.

Nickel and nickel-chromium cast iron have won for themselves a definite place in the steel industry and the development of their use is still progressing. The rolls used in a steel mill can be classified as either sand cast iron, chilled cast iron, steel or alloy. The latter term almost invariably refers to a nickel or nickel-chromium cast iron, a large number of which are sold under a trade name. The range of analysis of such rolls will approximate, silicon 1.00-2.00; manganese, 0.40-0.75; carbon, 1.50 to 3.50; chromium, 0.75 to 1.50; nickel, 0.50 to 1.50. Such rolls are used for roughing, stranding and finishing. They are fitted by their hard surface, toughness and resistance to wear to the first two uses. A chilled roll is found more often in the finishing passes.

Other accessories used in the manufacture of steel are regularly made from nickel or nickel-chromium mixes. These include rolling mill guides, which perform the function of leading the steel into the proper pass of the mill; bending dies in a pipe mill which bend the skelp into position to be welded and pipe balls which support the skelp during the welding operation. A typical analysis for these purposes is as follows: Silicon, 1.50 to 2.50; manganese, 0.40 to 0.70; carbon, 2.75 to 3.25; nickel, 1.00 to 2.50; chromium, 0.75 to 1.25. This should be given a good anneal prior to use. In making seamless tubing similar uses are found for these materials in the piercing and drawing plugs, while a considerable tonnage goes into forging industry as hammer blocks. For all these purposes the situation demands a material which has a great resistance to wear together with strength.

The use of nickel cast iron for cylinder blocks and pistons of automobile engines was developed by the Cadillac Motor Car Co., Detroit, in an effort to improve the quality of these castings and to secure greater length of service from them. The idea of using nickel in the cylinders was due to J. J. Wilson, of the Cadillac company, and its development has been further promoted by H. B. Swan, superintendent of its foundries, through whose courtesy I am able to present a brief description of their experience and practice.

For the cylinders an iron is used containing from 1.75 to 1.90 per cent silicon and from 1.50 to 2.00 per cent nickel. Without the nickel addition the brinell hardness would average from 130 to 150. With addition of nickel the hardness can be increased to 175 to 200. This increase may, of course, be accomplished by other means, but with increased difficulty in machining. Inasmuch as these difficulties are eliminated by the use of nickel, the experience of the Cadillac company has been that it is economical to secure this hardness by using nickel.

From service tests of cylinders they have found that with the lower hardness a wear of from 0.0015 inch to 0.002 inch was obtained in 20,000 to 25,000 miles and the cylinders would need regrinding. With a brinell hardness of 175 to 200, however, the cylinders showed a wear of only from 0.00075 inch to 0.001 inch and did not need regrinding. This company credits this decreased wear not only to the hardness of the iron, but also to the fine grain and high luster finish which can be produced with addition of nickel. It has been found that the nickel cast iron cylinders at 200 brinell hardness machine as easily as the non-nickel bearing ones at 150 brinell.

For pistons this company uses a 2.50 to 2.75 per cent silicon iron with about 1½ per cent of nickel. Without the nickel, the section of ⅛ inch is so thin that the iron would tend even with this high silicon content to be hard and mottled. The addition of nickel prevents the formation of any white iron, but gives a fine grain machineable iron.

In some recent tests in co-operation with another motor car manufacture, cylinders were cast with the regular mixture to which various amounts of nickel were added. The brinell hardness values on these cylinders indicate the effect of nickel:

	Brinell Hardness
Regular Mixture	141
0.89% nickel added	157
1.36% nickel added	170
1.89% nickel added	195

The addition of ¾ per cent of nickel decreases the rate of oxidation of cast iron at higher temperatures and in consequence such iron has been used to a limited extent in the production of molds for copper castings as well as in the glass industry for bottle glass molds. Similarly such iron has been used for zinc-base, die-casting nozzles.

The Westinghouse Electric & Mfg. Co. uses a 5 per cent nickel cast iron in the production of electrical resistance grids.* The nickel raises the electrical resistance and improves the mechanical properties and toughness of the castings which are necessarily of thin section. The nickel addition eliminates the tendency for the formation of hard or chilled white iron and thus strengthens and toughens the casting. These castings carry about 2.50 per cent silicon and from 4 to 5 per cent nickel.

In combination with chromium, nickel is added in amounts of from ½ to 1½ per cent nickel and ½ to 1 per cent chromium to white iron used for crushing rolls and machinery, grinding plates, sand blast nozzles.

H. T. Force** recommends the use of a 0.10 to 0.25 per cent chromium 0.10 to 0.20 per cent nickel cast iron for chilled car wheels.

In brief, the use of nickel alone appears to be justified when maximum hardness and fine grain are required for readily machineable gray iron, and particularly in thin sections or whenever the casting has both thin and thick sections.

The nickel chromium cast iron on the other hand appears to offer promise chiefly for chilled iron where maximum hardness is required but where the iron does not need to be machineable.

*Nickel in Iron Castings, D. N. Witman, 1921; paper before A. I. M. E. February meeting, also *Iron Age*, Aug. 25, 1921.

**Proceedings, A. S. T. M., 1921.

Societies News

MOST foundries are not suitably located, according to Frank D. Chase, foundry engineer, Frank D. Chase, Inc., Chicago, who spoke Feb. 13 before the New England Foundrymen's association at Boston. Mr. Chase said that while America was far ahead of England in foundry design, much must be done before low cost production of castings is achieved. In selecting a location for a foundry, he said, the important features to consdier were labor supply, room for expansion, disposal of waste material, and transportation of both raw materials and finished product. Each of these items was discussed as to the right and wrong method. A number of lantern slides were used to illustrate the talk.

* * *

Hold Annual Get-Together

Association of Iron and Steel Electrical Engineers, Cleveland district division, will entertain with its annual dance and get-together Saturday evening, Feb. 23, at Hotel Statler, Cleveland.

* * *

British Foundrymen To Meet

The annual meeting of the Institute of British Foundrymen will be held at Newcastle-on-Tyne, England, June 4-6. A number of papers will be read and discussed and visits will be arranged to prominent foundries in the vicinity where special facilities are available for studying the manufacture of castings for marine engines and ships. R. O. Patterson, Smith Patterson & Co., Blaydon-on-Tyne, president-elect, will occupy the chair.

* * *

Announce British Institute Meeting

The annual meeting of the Iron and Steel institute will take place on Thursday and Friday, May 8 and 9 at the headquarters of the Institute of Civil Engineers, London. The annual dinner will be held Thursday at the Hotel Cecil. The Worshipful Company of Blacksmiths, one of the ancient guilds of London has expressed a desire to renew its association with the iron manufacturing industry, the interests of which it was its original function to safeguard. Consequently the wardens have offered two admissions to the freedom and livery of the company at reduced fees to two members of the Iron and Steel institute. These members must be British subjects and recommended by the Institute council.

* * *

Fuel Association to Meet

The International Railway Fuel association will hold its sixteenth annual convention in Chicago, May 26-29. Headquarters will be at the Hotel Sherman. W. H. Harris, president W. H. Harris & Co., Chicago, has been made chairman of the local committee on arrangements. At a recent meeting of this committee tentative plans were made for an exhibition of coal, coke, oil and general supplies at the hotel during the convention week. The association has for its object the benefaction of members in an educational way and the advancement of employer interests by the dissemination of information covering the best ideas and practices in the purchasing, handling and use of fuel.

* * *

Announces Spring Meeting

The American Society for Steel Treating has just announced that its spring sectional meeting will be held at the LeClaire hotel, Moline, Ill., May 22 and 23. The society will be the guests of the Tri City chapter, whose activities include Moline, Ill., East Moline, Ill., Rock Island, Ill. and Davenport, Ia.

Coast Association Grows

Seattle, Feb. 14.—At the annual meeting of the Federated Industries, a state organization of industrial leaders, N. D. Moore, vice president Pacific Coast Coal Co., was chosen president, E. I. Garrett, president Puget Sound Machinery Depot, first vice president; R. W. Vinnedge, vice president North Bend Lumber Co., second vice president; E. B. Chinn, Seattle logging operator, treasurer. Manager J. H. McIntosh reported that during the last two years the membership has increased from 2000 to 3150.

Convention Calendar

Feb. 26-27—Southern Metal Trades association. Annual convention, St. Charles hotel, New Orleans. W. E. Dunn Jr., Healey building, Atlanta, Ga., is secretary.

April 23-24—National Metal Trades association. Annual convention at the Hotel Astor, New York. Louis W. Fisher, Peoples Gas building, Chicago, is secretary.

April 24-26—American Electrochemical society. Spring meeting at Philadelphia, Dr. Collin G. Fink, Columbia university, New York, is secretary.

April 28-30—American Gear Manufacturers' association. Spring meeting, Lafayette hotel, Buffalo. T. W. Owens, 2443 Prospect avenue, Cleveland, is secretary.

April 30-May 2—Society of Industrial Engineers—Annual convention at Buffalo. George C. Dent, 608 South Dearborn street, Chicago, is secretary.

May 8-9—British Iron and Steel institute. Annual meeting at the Institution of Civil Engineers, London. G. C. Lloyd, 28 Victoria street, London, is secretary.

May 19-21—Southern Supply and Machinery Dealers' association, National Supply and Machinery Dealers' association, and American Supply and Machinery Manufacturers' association—Triple convention at Hotel Cleveland, Cleveland. F. D. Mitchell, 1819 Broadway, New York, is secretary.

May 20-23 National Association of Purchasing Agents. Annual convention at Boston. J. H. Leonard, Corn Exchange bank, Bridge Plaza, Long Island City, N. Y., is secretary.

May 22-23—American Society for Steel Treating. Spring sectional meeting, LeClaire hotel, Moline, Ill. W. H. Eisenman, 4600 Prospect avenue, Cleveland, is secretary.

May 26-29—American Society of Mechanical Engineers—Spring meeting Hotel Cleveland, Cleveland. Calvin W. Rice, 29 West Thirty-ninth street, New York, is secretary.

List Structural Exports by Countries

Washington, Feb. 19.—January exports of structural shapes listed by countries reveal the increased purchases of Japan, which received 1130 tons of plain and 128 tons of fabricated shapes in that month. Canada continues to be the largest buyer of plain shapes while Mexico received the greatest tonnage of fabricated material. Details of the larger shipments follow:

Countries	Plain shapes	Fabricated shapes
Canada	3,891	49
Japan	1,130	128
Cuba	364	127
Philippine Islands	177	48
Colombia	105	87
Nicaragua	105	113

Shares To Be Issued in Profit Sharing Plan

Details now are available pertaining to the profit sharing plan adopted recently by the Midland Steel Products Co., Cleveland, which includes some special features of interest. The following percentage of net earnings will be put into a profit sharing fund: 4 per cent on such earnings if $1,000,000 but less than $1,249,999; 5 per cent if $1,250,000 but less than $1,499,999; 6 per cent up to $1,749,999; 7 per cent up to $1,999,999; 8 per cent up to $2,249,999; 9 per cent up to $2,449,999 and 10 per cent on such earnings if $2,500,000 or over.

It is expected that the fund will be divided into 400 shares. These shares will be allocated by the president to the following classes of employes: Work managers, shop superintendents, production managers, production engineers, chief inspectors, purchasing agent and assistants, employment managers, traffic managers, foremen, salesmen and sales engineers, auditors and cost accountants, executive officers and others whom is it deemed desirable to have interested in the profit sharing fund, may be added by the president upon the recommendation of the various department heads. The company is to reward those who have contributed to its success in a special degree by their inventions, ability, industry, loyalty, disposition, responsibility, energy, economy, suggestions, ideas or improvements of special value. The secrecy with which each employe holds his allotment will be a factor for or against the employe's allotment in subsequent years.

Men of Industry

Personal News of a Business Character Pertaining to the Iron and Steel and Related Fields of Enterprise

ME. JOHNSON, assistant general manager of sales of the Pittsburgh Steel Co., Pittsburgh, has been appointed in charge of its New York office located in the Equitable building, that city, to succeed C. M. Porcher, resigned. Mr. Johnson will have jurisdiction over both the domestic and export business of that office. He entered the employ of the Pittsburgh Steel Co. in 1902, during which year the company first operated rod and wire mills, assuming the duties of assistant manager of the wire fence department. In 1909 he became assistant general manager of sales and since 1915 has had charge of the export department in New York.

Mr. Porcher whom Mr. Johnson succeeded as manager of the New York office has spent 22 years in the sale of the Pittsburgh company's products. He was a member of Pierson & Co., iron and steel merchant, of New York, during the period of 1902 to 1909, when it represented Pittsburgh Steel Co. in the eastern district. In the latter year, the Pittsburgh company opened its own offices in New York and Mr. Porcher then withdrew from Pierson & Co. to become its New York manager, devoting all of his time to sales in the eastern district, in which work he has been since engaged.

* * *

L. Hiler has been selected to succeed P. W. Jones Sr. as superintendent of the Buckeye Rolling Mill Co. Newark, O.

* * *

F. M. White, who has been Chicago district sales manager for the Corrugated Bar Co., will hold a similar position with Kalman Steel Co., which has purchased the Corrugated company.

* * *

Walter H. Duncan, recently connected with the sales staff of the road equipment department of Blaw-Knox Co., Pittsburgh, formerly was field engineer for John F. Casey Co., contractor.

* * *

Charles L. Pollock has been made general manager of sales for the Canonsburg Steel & Iron Works, Canonsburg, Pa., manufacturer of sheet steel. He was connected until recently with Apollo Steel Co., Apollo, Pa., for about 11 years, first as secretary and later as general manager of sales.

* * *

Seth L. Martin, recently identified with the Aetna Steel Co., Southington, Conn., formerly was president of the Bancroft & Martin Rolling Mill, Portland, Me.

* * *

Mac G. Bell, superintendent of open hearths of the Pardee Steel Corp., Perth Amboy, N. J., has resigned his position and retired from the steel industry.

* * *

Julian Kahn, Youngstown, was re-elected president of the Truscon Steel Co., at the annual meeting recently. Other officers and the board of directors also were re-elected.

* * *

Richard T. McGee, recently connected with the Dillon Bros. Machine Co., Bridgeport, O., formerly was a mechanical engineer associated with Ackermann Mfg. Co., Wheeling, W. Va.

* * *

P. D. Howe has resigned as treasurer of the Saco-Lowell Shops, Boston. He is succeeded by Robert F. Herrick Jr., formerly general agent of the plant at Lowell, Mass.

* * *

Paul G. Leoni of the Iron & Ore Corp. of America, 11 Broadway, New York, is making an extensive business trip on the Pacific Coast and at present is stopping in San Francisco.

* * *

A. Michaels, recently placed in charge of the rail department of the Pittsburgh office for Hyman-Michaels Co., Chicago, iron and steel scrap, new and relaying rail dealer, formerly was connected with the home office.

* * *

Stanley H. Smith, for many years manager of railroad sales for the Bethlehem Steel Co., now is in charge of the Chicago territory of the Wyoming company with the title director of railroad sales.

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J. H. Hogue, for the past five years superintendent of the foundry for the French Foundry Co., Piqua, O., has accepted a position with the Turner & Seymour Mfg. Co., Torrington, Conn.

* * *

Richard Peters Jr., of Robert C. Lea & Co., Philadelphia, addressed the City Historical society of Philadelphia Feb. 19 on the "Early Iron Industry of Philadelphia and Vicinity."

* * *

Burrows Sloan, vice president of General Refractories Co., Philadelphia, and John R. Sproul, treasurer of that company, who have been in Europe on a business trip, are expected to return about the end of February.

* * *

G. E. Greer, recently made vice president of the William H. Ziegler Co., Minneapolis, distributor of shovels produced by the Wyoming Shovel Works, formerly was in charge of the railroad sales of the Wyoming company in its Chicago office.

* * *

John Robertson, recently appointed manager of the Regina branch of Waterloo Mfg. Co., Waterloo, Ont., thresher and tractor manufacturer, was for the past 10 years manager of the Winnipeg branch of the Sawyer Massety Co., Ltd.

* * *

E. N. Hurley, recently nominated as a member of the American Debt Funding commission, and confirmed in that nomination by the United States senate, is president of the Hurley Machine Co., Chicago and New York. He was head formerly of the United States shipping board.

* * *

E. P. Lane for the past nine years connected with the engineering department of Stone & Webster Inc., resigned Feb. 1 to enter the printing business at Manchester, Mass. Previous to his association with Stone & Webster, Mr. Lane was with the New York Central railroad for eight years and prior to that was with the American Bridge Co.

* * *

A. R. Budd, formerly vice president of the Diamond Coal & Coke Co., has been appointed vice president of the Hillman Coal & Coke Co., and J. D. Martin has resigned

as chief engineer of that company to become general superintendent of the Virginia Iron, Coal & Coke Co., Roanoke, Va.

* * *

J. C. Mead, present circuit clerk at Oregon, Ill., will join the Paragon Foundries Co., that city, as assistant superintendent.

* * *

John Inglis, president of the American Blower Co., Detroit, has been named a director of the Detroit branch federal reserve bank of the seventh district, for three years.

* * *

M. A. Jones, assistant secretary and purchasing agent, Mahoning Valley Steel Co., Niles, O., has resigned from that company and will join the Waddell Steel Co. in an executive capacity.

* * *

Francis L. Higginson Jr., recently elected a director of Lockwood, Greene & Co. Boston, engineer, is a member of Lee, Higginson & Co. Henry W. Howe, also elected a director of the engineering company is a member of Lawrence & Co.

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J. O. Heitsenrether, vice president and sales manager of the United States Refractories Corp., Mount Union, Pa., is spending a few weeks in the Pittsburgh office, directing the sale of brick in the western Pennsylvania district.

* * *

C. W. Mains, chief engineer of the Stanton Ironworks Co., Ltd., England, expects to sail for a few weeks' visit to the United States in March for the purpose of studying American iron and steel works practice.

* * *

L. H. Holmes, has resigned as Boston district agent of McClintic-Marshall Co. to become a member of Weaver Co., Lansdale, Pa., structural fabricator. Mr. Holmes had been identified for many years with the McClintic-Marshall Co.

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A. W. Rohn, Baraboo, Wis., who opened and developed the Cahoon iron mine near that city, has accepted a position with the Donner Mining Co., in charge of its two-shaft property at Hibbing, Minn. Mr. Rohn took charge of the property on Feb. 1.

* * *

Charles P. Buck, inventor of a regulator for oil handling equipment and for the past 12 years sales manager and general manager of the Perfection Metal Products Co., Topeka, Kans., has resigned to form a company with C. E. Gault, to be known as Gault & Buck.

* * *

Myron Summers, salesmanager, Superior Sheet Steel Co. has resigned his position and will become indentified with W. A. and C. S. Thomas who recently acquired the Thomas works of the Youngstown Sheet & Tube Co., at Niles, O., including 12 hot and six cold sheet mills.

* * *

C. W. Eger, managing director of Elektrokemisk Industri, Norway, and his metallurgical advisor, Dr. M. Sem, are in the United States at present on business for that company. While in America they may be located through their representative here, the Electric Furnace Construction Co., 1015 Chestnut street, Philadelphia.

* * *

Harry C. Thomas, assistant general manager of the United Alloy Steel Corp., Canton, O., has resigned, effective this week, it was announced Feb. 16. Mr. Thomas said he expects to leave Canton for Los Angeles, about March 1 and then would start on a tour of the world. On his return from the world tour he said he intends to re-enter the steel industry.

* * *

E. F. W. Alexanderson, consulting engineer of the General Electric Co. and chief consulting engineer of the Radio Corp. of America, has been awarded the Order of Polonia Restituta, by the Polish government, in recognition of his meritorious services in connection with the building of Poland's new radio station near Warsaw.

* * *

B. R. Gllyenram, assistant manager, and Sven Nilsson, foundry superintendent, Husqvarna Vapenfabriks A. B., Husqvarna, Sweden, foundry interest manufacturing light castings, stove plate and sanitary ware, are touring the foundry centers from Boston to Milwaukee and St. Louis. They are making a detailed study of American foundry practice and equipment.

* * *

Louis A. McAbee has been appointed district representative with headquarters at Hagerstown, Md., by Eastern Fuel Co., Pittsburgh. Mr. McAbee is well known as a traffic expert, having been stationed at various points in the United States in charge of traffic for the aviation service during the world war. His start in railroad work began with his appointment as secretary to Dudley G. Gray, then general freight agent of the Baltimore & Ohio railroad, now vice president of the Western Maryland railway.

* * *

W. H. Patterson, recently connected with the John H. Dunham Co., Chicago, advertising company, was formerly with Westinghouse Electric & Mfg. Co. as manager of the resale-industrial sales department. Mr. Patterson has been identified for many years with the development of motors and control apparatus for cranes, elevators, hoists, etc. He is a graduate of Purdue university and a member of the American Institute of Electrical Engineers.

* * *

William D. Fraser recently resigned as manager for Berkshire Mfg. Co., Cleveland, maker of molding machines and vibrators, has been in charge of the manufacturing operations for this company since 1911. His first employment was with Cummer Engine Works, now Kilby Mfg. Co., when the former plant built steam engines. After leaving the Cummer company Mr. Fraser was with the Brown Hoisting Machinery Co. for four years, leaving there to take charge of the Cleveland-Gordon Press Co., manufacturer of printing presses. After two years Mr. Fraser established the Fraser Machine Works, now the Industrial Machine Works. He returned to Cleveland shortly afterward to asume charge of the Berkshire Mfg. Co.

* * *

George A. Drysdale recently made metallurgical editor of *The Foundry* succeeding the late H. E. Diller, has had 26 years experience in practical foundry and metallurgical work, following his graduation from college in 1898, and is widely known through his writings on technical subjects. Mr. Drysdale was born in Swansea, S. Wales, England in 1873, and emigrated to Boston with his parents in 1883. He attended the collegiate school and university of Kings college, Nova Scotia and was graduated from McGill university, Montreal, Que., with the degree of bachelor of applied science in 1898. Later the same university conferred the degree of master of science in recognition of his attainments in practical chemistry and metallurgy.

He first was employed by the Howard & Bullough American Machine Co., Pawtucket, R. I. as foundry chemist. In 1903 he became metallurgist for the Stover Mfg. Co., now the Stover Mfg. & Engine Co., Freeport, Ill. He later became head of the raw material inspection department of International Harvester Co. of Canada, Ltd., Hamilton, Ont. with supervision of the chemical and physical laboratories. In 1911, he became chemist and metallurgist for Atlas Engine Works, Indianapolis.

Mr. Drysdale left the Atlas company in 1912 to engage in research work for the Ingersoll-Rand Co., Phillipsburg, N. J. on malleable iron. In 1913 he returned to the Atlas Engine Works, reorganized as the Lyons-Atlas Co., and later the Midwest Engine Corp., Indianapolis, and since then has been identified with that company and associated interests.

Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

THEODORE AHRENS was elected president of the Standard Sanitary Mfg. Co., at the directors' meeting, Jan. 31. J. W. Oliver was elected vice president and head of the executive committee; W. C. McKinney, secretary and treasurer; Willard C. Chamberlin, vice president and general sales manager; H. M. Reed, general manager of factories; Theodore Mueller; assistant general manager of factories and M. C. Wilde, assistant secretary. Mr. Ahrens was re-elected to the position held by him since the inception of the company. Mr. Oliver has been with the Standard company or its allied companies since 1903 and Mr. McKinney was formerly general manager of factories. Mr. Chamberlin was first connected with the company in 1907. He has been manager of the San Francisco office and later of the Pacific coast territory. He has held the position of general sales manager for several years. Mr. Reed has been assistant general manager of factories for a number of years. Mr. Mueller has been manager of the Louisville works for some time. Mr. Wilde and Mr. DeHaven were re-elected to their former positions. Mr. Wilde having been connected with the company since its beginning and Mr. DeHaven starting with it as a boy.

* * *

THE Coy Valve Co., Chehalis, Wash., has completed a brass foundry and machine works. T. J. Long is president; William F. West, vice president; A. L. Generaux, secretary and Chas. L. Brown, treasurer.

* * *

PRODUCTION of tin, lead and babbitt metals is to begin in several weeks in the new foundry of the Statter Metal Co., 952 Hanna building, Cleveland. The foundry, now under course of construction at 7700 Bessemer avenue, represents an expenditure of about $40,000 including equipment which has been purchased. L. B. Satter is treasurer of the company.

* * *

FRANK H. LANGSENKAMP has incorporated the Langsenkamp copper smithing and canning equipment manufacturing business, at 130-142 East Georgia street, Indianapolis, under the name of F. H. Langsenkamp Co, to give long time employes an opportunity to buy an interest in the company. A total of 1750 shares of no par value has been made available on terms to the incorporators by Mr. Langsenkamp at $100 a share. The incorporators, who are directors of the new company, include Lawrence G. Geis, Elmer C. Prange, James J. Nitchum and Henry Marshall.

* * *

FARM machinery and produce will be handled by Edwards & Carey, Inc., Bridgehampton, N. Y., recently incorporated for $50,000. All equipment has been purchased to equip the completed plant. E. S. Edwards is president, R. F. Carey, vice president, and I. T. Edwards, secretary and treasurer with offices at R. R. avenue, Bridgehampton.

* * *

NO NEW buildings or equipment are needed at present by Clarage Fan Co., Kalamazoo, Mich., recently incorporated for $1,000,000 to take over the business of the old company of that name which was a private ownership. Charles Clarage is president of the new company, F. McMurdie, vice president and R. R. Ware, secretary and treasurer. The company manufactures fans, blowers, air washers, engines, heating and ventilating equipment and also does a general foundry and machine shop business.

* * *

RECENT incorporation of the American By-Products Corp., Donegan building, Vancouver, Wash., has resulted in that company taking over all interest and assets of the Chemical By-Product Industries. The new company was incorporated for $2,000,000. It will produce equipment for the process of recovery of oils, chemicals, drugs, and other by-products from coal, lignite, oil shale, sawdust and waste wood. A large machine of that type in which the company specializes is planned for construction this summer near Kelso, Wash. The machine will have a capacity of 250 tons a day. Henry C. Prudhomme is secretary and general manager of the American company.

* * *

MOTORS METAL MFG. CO., Detroit, manufacturer of hoods, tanks, fenders, sod pans, and other stampings, etc., elected George E. Roehm president at the recent annual meeting of the board of directors. William Christian was elected vice president, Robert R. McMath, treasurer and general manager; N. C. Johnson, secretary, F. B. Fick, sales manager, and G. S. Burke, purchasing agent. The first three officers and C. R. Talbot, George R. Harris, F. C. McMath, Willard Hope, Lloyd N. Allen, F. G. Christian, Dr. T. C. Buttrick and H. A. Burnett, were elected directors.

* * *

BLAW-KNOX CO., Pittsburgh, manufacturer of steel products such as furnace equipment, road building equipment, etc., announces the following personnel changes: Robert T. Harris, formerly in the New York office has been transferred to Baltimore as district sales manager; Charles K. Wehn, formerly at the Chicago office, has been sent to Pittsburgh as district manager of the standard steel building department; R. D. Spradling has been transferred from Baltimore to Chicago where he is district manager of the standard building department, and William F. Glasser, formerly engineer in the heavy forms department has been appointed assistant chief engineer of that department.

* * *

THE Marion Forged Products Co. became successor to the Western Drop Forge Co., Marion, Ind., following the sale of the property recently under order from the circuit court. Directors of the reorganized company are: Frank W. Trabold, president; Robert R. Batton, vice president; Frederick W. Davis, treasurer; J. M. Wilson, secretary, and Milton Matter.

As a source of working capital, $125,000 of five year 7 per cent bonds was issued, the merchandise creditors' claims being settled on a basis of 50 per cent cash and 50 per cent bonds.

The preferred stockholders of the old company will receive as par value common stock in the new company. Under the reorganization, the plant is entirely under local management and is freed from any connection with the R. L. Dollings company.

The new company will manufacture forgings of carbon and alloy steels, brass, bronze, copper and aluminum, also a line of finished wrenches, chain pipe hooks, clamps, etc.

Obituaries

EDWIN LUDLOW, ex-president of the American Institute of Mining and Metallurgical Engineers, died Sunday Feb. 10 at Muskogee, Olka., aged 65 years. He was born at Oakdale, L. I., and was graduated from Columbia university. From 1898 to 1910 he was manager of the Mexican Coal & Coke Co., Las Esperanzas, Mexico, in 1913 becoming vice president of the Lehigh Coal & Navigation Co., which position he relinquished in 1920 to become consulting mining engineer at New York. Last year he went to Oklahoma to take charge of his coal properties there.

* * *

Edwin Davis, formerly associated with the Elbel Hardware Mfg. Co., Canton, O., died at his home in that city Feb. 13.

* * *

William L. Thompson, for many years associated with the Saco-Lowell Shops, both at the plant at Newton Upper Falls, Mass., and the Boston office, died at home in Newton Upper Falls Feb. 10.

* * *

W. H. Murphy, treasurer of Williamson Heater Co., Cincinnati, died recently at his home in that city. He entered the employ of the Williamson company 25 years ago as a cashier. He was 60 years old and prominent in Cincinnati business and fraternal circles.

* * *

Siegfried Heller, president and chief owner of S. Heller Elevator Co., Milwaukee, electric and hydraulic freight and passenger elevators, died Feb. 11 of pneumonia after a brief illness. He was 55 years old and a native of Germany, coming to America in 1884 and opening the elevator works in 1893.

* * *

Walter Tufts, identified with the white lead products industry for many years, died at his home in Boston Feb. 8. Mr. Tufts was vice president and treasurer of National Lead Co. of Massachusetts, vice president of Chadwick-Boston Lead Co., and a director of United Lead Co, National Lead Co. of New York, and Webster & Atlas National bank, Boston.

* * *

B. L. Knowles, manager of the publicity department of Worthington Pump & Machinery Corp., 115 Broadway, New York, died Feb. 14 of cerebral hemorrhage, at 45 years of age. He started with the Worthington corporation as a boy and spent 28 years in its service. He was a member of the Technical Publicity association, National Industrial Advertisers association, the Mayflower society and other bodies.

* * *

Harry M. Clark, aged 65, an official for many years of the McKeesport Tin Plate Co., McKeesport, Pa., died Feb. 11 in his home at Otto, Pa. He was born in Wheeling, W. Va., and came to McKeesport from Jersey City, N. J., in 1902, when the Portvue plant of the tin plate company was opened. He first was employed by the company as a bookkeeper and later became assistant treasurer, secretary and then company auditor, a position he held until three years ago when ill health forced his retirement.

* * *

Frederick H. Snyder, director of eight manufacturing companies in Massillon, O., and president of five of those, died at his home in that city recently at the age of 84 years. Among those companies of which he was president, were the Hess Snyder Mfg. Co., Peerless Drawn Steel Co. and the National Sanitary Co., Salem, O. His first business connection was with a foundry and machine shop which in 1882 was consolidated with the Hess interests to become the Hess Snyder Mfg. Co.

* * *

William H. Birkmire, well known in the steel construction industry, died of a complication of diseases at his home in New Rochelle, N. Y., Feb. 9. Mr. Birkmire was born at Falls of Schuylkill, Philadelphia, in 1860. He then studied architecture and came to New York in 1885 to take care of the construction department of the Jackson Architectural Iron Works. In 1892 he joined the old firm of J. B. & J. M. Cornell, for which he had charge of the construction of the Astor hotel. He later became president of the Building & Engineering Co. Among important jobs which he completed was the construction of the Mexican national opera house at Mexico City. He was the author of "The Planning and Construction of High Office Buildings." "Architectural Iron and Steel," and other books on modern building methods.

Licensed To Manufacture Rustless Iron

An arrangement has been made through Campbell & Gifford, consulting engineers, 17 Victoria street, London, with Perin & Marshall, consulting engineers, 1107 Broadway, New York, for the manufacture in the United States of rustless iron in electric furnaces by the Hamilton-Evans process, which was developed in England. In this process the chromium alloy is added to the bath in the electric furnace so that the rustless iron is made in one operation, two slags being used. It is understood in London that an American company known as the Hamilton-Evans Process Corp., is being organized with headquarters in New York.

Build Factory Structures on Credit Plan

A new plan for the financing of industrial building construction is announced by the Blaw-Knox Co., Pittsburgh. This puts the purchase of buildings for every use on a "pay for them as they earn for you" basis. The idea is to minimize building investment and so release funds for active use in the development of business.

In an outline of the plan, A. C. Lehman, president of the company, refers to the extended payment plans that have been applied to the purchase of automobiles, household goods and other commodities, and he believes that the same fundamentals may be applied successfully to manufacturing buildings costing $1000 to $50,000. The need for all the capital available in a business enterprise frequently makes it difficult or impossible for a company to obtain the kind of structures which it needs.

Negotiating for loans, mortgages, raising of cash by liquidating securities or by stock issues present obstacles which defer building projects. The new plan is intended to minimize delay and time-consuming effort, and make it possible for a business enterprise to obtain "a home" with small expenditure, through credit. Mr. Lehman says:

"The last 15 years have seen a revolution in industrial building methods. In this short time century-old customs has been discarded rapidly. A new era is here, with the perfection of standard steel buildings that have cut squarely in half the cost of first class construction. Speed is vital to success in meeting demand and competition. Six months or a year has usually been considered fast time for erecting big factory buildings. But the best speed records of past years are made ridiculous by the short time required for erecting the standard steel buildings of today. Factories are available in 30 days. And the remarkable part is that though so speedily erected they are just as serviceable and satisfactory as the old-time buildings."

Machinery Lull but Temporary

Constant Flow of Inquiries into Market Denotes Heavier Buying in Near Future—Japan Expected To Purchase for Reconstruction Purposes—Secondhand Equipment Still in Good Demand—Crane Orders Slacken Somewhat

TEMPORARY lull prevailed in the machine tool and shop equipment market last week due to unsettled conditions resulting from governmental investigations and the holiday which was observed quite generally in the East. With inquiries being maintained at a fair volume closing action is expected shortly on lists now before the market. Bids on the greater part of equipment for which the Santa Fe is in the market are to go in this week. The New York Central again has extended its list as has the Santa Fe. The latter road will take bids up to Feb. 28 on an additional six tools.

Possibility of an increase in export business is reflected in the favorable reception being accorded the Japanese reconstruction loan. Considerable buying is expected to develop in this quarter in the next few weeks. A Chilean interest recently closed on a half dozen tools in the New England district. Other export business is but fair.

Inquiries continue to be brought out in good volume for used machinery but buyers generally are slow in closing on requirements. Sales of machine tools out of stock have been only fair during the past week. A cheerful feeling prevails in the market as increased buying is expected to develop before the end of this month or in the first part of March. Automotive buying continues to take a large portion of this business. Crane sales have slackened somewhat from the volume of preceding weeks but inquiries indicate increased buying in the near future.

Railroads Add To Extensive Equipment Lists

NEW YORK, Feb. 19.—Demand for machine tools last week was about the lightest in the local market this year. Orders were scattered, and inquiries featureless. As mentioned in recent issues, considerable equipment is under active contemplation by New York Central and Southern railroads but this business is being placed slowly. The recent holiday, observed quite generally in some sections of the East is believed to have been a factor in this dullness. Included in the few orders reported are a car box borer for the Southern Pacific railroad, and a 5-foot boring mill for Cameron Can Co., Chicago.

The favorable reception being accorded the Japanese loan at this time supports the belief that substantial buying by that country may develop over the next few weeks. The export situation, otherwise, shows relatively little promise for the near future.

Bids submitted to the war department on a 150-ton crane for installation at Florence, Ala., and awarded to Niles-Bement-Pond Co. are as follows: Pawling & Harnischfeger Co. $49,650; Morgan Engineering Co. $42,450; Shaw Electric Crane Works, $40,100; Alliance Machine Co. $36,900; Whiting Corp. $35,950; and Niles-Bement-Pond Co. $33,450. It is understood that the bid of the Cleveland Crane & Engineering Co. was withdrawn because it was not figured on an erection basis. There was an alternate proposition which called for an additional 150-ton crane and on this the line-up of the bidders was substantially the same.

Calendar and Selected News of Plant Liquidations, Wholesale Offerings, Auctions of Used and New Equipment, Etc., Page 90, Classified Machinery Section.

Excepting for an improvement in inquiry for handpower cranes, the local conveying equipment market is featureless.

Tool Builders Hopeful

BOSTON, Feb. 19.—Miscellaneous buying of individual tools continues to feature the New England market. The few lists which came out in January still are before the trade with every prospect of their closing before the end of the month. The General Electric Co. has purchased a few tools for its works at Lynn, Mass., and one or two other large manufacturers have made moderate purchases. The list of recent buyers includes a widely diversified field from candy manufacturers and shoe factories to the general machine shop. Buying of used tools is more vigorous at present than that of new equipment despite several recent auction sales. A sale of the equipment of the Bristol Mfg. Co. at Bristol, Conn., is announced for the near future. The grinding wheel plant of the International Abrasive Corp. at Waltham, Mass., is to be sold at auction and a considerable quantity of tools is expected to be thrown on the market.

New England manufacturers are taking considerable interest in the exposition of the American Society for Steel Treating which is to be held at the Commonwealth Pier, Boston, next September. New England tool manufacturers report improved inquiry from foreign manufacturers. A Chilean interest recently has purchased half a dozen tools in this district.

Buying Is Steady

PITTSBURGH, Feb. 19.—Steady demands are being made upon the sellers of machine tools and equipment in this vicinity, although larger buying still appears to be prospective. The Pennsylvania railroad's recent purchases for Sharpsburg, Pa., included a 24-inch shaper from one dealer, and a 36-inch lathe with 36-inch crank planer from another. The Standard Sanitary Mfg. Co. still is negotiating. Bids are being filed on the requirements of the National Tube Co., Gary Tube Co. and the Westinghouse Electric & Mfg. Co. the latter for its East Pittsburgh and Sharon, Pa., plants. Its purchases for small service stations largely have been completed. A large number of single tool orders are received each week. One or two dealers active last week report quietness this week, while others report an increase in activity. A West Virginia user bought five woodworking machines and a manufacturer located nearer by purchased a 6-spindle ballbearing drill with hammer attachment. Motor-driven lathes,

radial drills and small drills are among the items disposed of here this week, including several used lathes. Inquiries are numerous for new and used equipment from practically every line of manufacture utilizing machine tools, including railroads, coal companies, steel producers, etc.

Several additional crane inquiries have been closed up and one or two new ones are out, including one from a United States Steel Corp. subsidiary for two 10-ton cranes for delivery to a nearby point. A large number of propositions are before sellers here, among the largest being that of the American Sheet & Tin Plate Co. for Cambridge, O., involving four cranes.

Planers Still Are Most Active

CINCINNATI, Feb. 19.—Planers continue the most active of the heavier machine tools, one Cincinnati firm having a score of live inquiries and another firm a dozen. The G. A. Gray Co. has five planers on its board for Ford Motor Co., Detroit. Inquiry for approximately 10 milling machines and a like number of lathes and boring mills is reported.

The largest inquiry in the market is the list of the Santa Fe railroad which will be closed this week. This contains 52 items for equipping a machine shop and involving between $350,000 and $400,000. A number of local manufacturers have bid on the different items composing the list. Other railroad activity is confined largely to single tool orders. Manufacturers say that the volume of inquiries is larger than at any other time during the past six months. A number of inquiries for lathes are before the trade from steel companies. Dealers in secondhand machinery are enjoying better business in a majority of cases, although the volume is not up to expectations.

Santa Fe Adds to List

CHICAGO, Feb. 19.—The Atchison, Topeka & Santa Fe railroad has added six machine tools to its already long list. It will take bids up to Feb. 28 on two 16-inch x 6-foot Lodge & Shipley Machine Tool Co. or equivalent, portable lathes, one 36-inch x 12-foot Boye & Emmes Machine Tool Co. or equivalent, triple-geared lathe, one 1½ x 24-inch Jones & Lamson Machine Co. or equivalent, flat turret lathe, one No. 3 Acme Machine Tool Co. universal turret lathe, and one 24-inch x 12-foot Boye & Emmes company selective head engine lathe. A local machinery house has sold two lathes to an eastern railroad. The Bradford Corp., maker of railway supplies, suffered a fire loss recently in its machine shop and may have to replace some equipment. An Illinois interest has closed for a medium-sized planer. Sales of machine tools out of store have been rather light this past week. Dealers in used machinery have enjoyed only fair business, but look for heavier demand before the end of the month.

Lull Believed Temporary

CLEVELAND, Feb. 19.—Lull in demand characterizing the machine tool market last week is believed temporary by many dealers. A slightly unsettled feeling resulting from governmental investigations is reported as contributing to the falling off in orders. Single tool lots continued to predominate during the week both in orders and inquiries.

Inquiries are well maintained in volume. The New York Central has added to its recent long list with two inquiries. An Ohio manufacturing company has inquired for a hydraulic press and a metal products manufacturer for two 16-inch lathes. Automotive buying continues mainly for replacement purposes although some purchases are being made for expansion.

Demand for used machinery is better although many buyers experienced a lull last week as compared with business during the past month. Small orders are the rule with few dealers reporting more than single machine purchases. Liquidation of manufacturing companies is slowing the resale market somewhat although equipment offered for sale by companies in the course of dissolution are sometimes priced higher than the regular figures several local dealers are quoting.

Crane Awards and Inquiries of the Week

Orders Placed

One 10-ton and one 5-ton electric traveling crane for Easton Structural Steel Co., Easton, Pa., to Whiting Corp.

One 5-ton pillar crane for Chicago & Western Indiana railroad, to Whiting Corp.

One 10-ton electric traveling crane for Dreis & Krump Mfg. Co., Chicago, to Whiting Corp.

One 45-ton electric traveling crane for Kentucky Hydro-Electric Co., Chicago, to Whiting Corp.

Two 20-ton, one 15-ton, one 12-ton, three 8-ton, three 5-ton and one 2-ton electric traveling cranes and three 1-yard bucket cranes for National Plate Glass Co., Ottawa, Ill., to Whiting Corp.

One 15-ton electric traveling crane for Bliss & Laughlin, Harvey, Ill., to Whiting Corp.

One 5-ton electric box girder crane, 46-foot 8-inch span, for Flockhart Foundry Co., Newark, N. J., to Pawling & Harnischfeger Co.

One 5-ton electric crane, 35-foot span, for Birmingham, Ala., plant of United States Cast Iron Pipe & Foundry Co., Burlington, N. J., to Pawling & Harnischfeger Co.

One 25-ton locomotive crane for Hunters Point Lumber & Supply Co., Long Island City, N. Y., to Brown Hoisting Machinery Co.

One 20-ton locomotive crane for Graves Bros., Hosford, La., to American Hoist & Derrick Co.

One 20-ton locomotive crane, equipped with magnet and bucket, for a northern New Jersey manufacturer, to McMyler-Interstate Co.

One 5-ton handpower crane for Eagle Bronze Co., Mt. Vernon, N. Y., to Whiting Corp.

One 18-ton locomotive crane for a northern New Jersey sand company, to McMyler-Interstate Co.

One 45-ton locomotive crane, for Pickands Mather & Co., Cleveland, to Industrial Works, through Ridenour, Seaver & Kendig, Cleveland.

One 5-ton electric crane, 93-foot span, for Bliss & Laughlin, Harvey, Ill., to Whiting Corp.

One 10-ton electric gantry crane, 41-foot span, for New York, New Haven & Hartford railroad, for installation at Cedar Hill, New Haven, Conn., to Whiting Corp.

One 150-ton electric crane, 10-ton auxiliary, 65-foot span, for engineering section of the war department, Florence, Ala., to Niles-Bement-Pond Co.

One 1-ton handpower crane, 34-foot span, equipped with electric hoist, for Metropolitan Ice Co., South Orange, N. J., to New Jersey Foundry & Machine Co.

One 5-ton handpower, single I-beam crane for a New York company, to New Jersey Foundry & Machine Co.

One 10-ton trolley for Vulcan Mould & Iron Corp., Latrobe, Pa., to Shaw Electric Crane Works.

Two 6-ton cranes or assembly hoists with 22-foot, 8-inch span for McClintic-Marshall Co., Rankin, Pa., to Shaw Electric Crane Works.

One 2-ton crane with 19½-foot span for Union Drawn Steel Co., Beaver Falls, Pa., to Detroit Hoist & Machine Co.

One 5-ton crane with 33-foot span for Ellwood City Forge Co., Ellwood City, Pa., to Detroit Hoist & Machine Co.

One 7-ton crane with two trolleys for McClintic-Marshall Co., Pottstown, Pa., to Shaw Electric Crane Works, previously reported as one 10-ton crane.

One No. 2 crawler-type locomotive crane for Duquesne Slag Products Co., Pittsburgh, to McMyler-Interstate Co.

Orders Pending

Four cranes, including two 10-ton and one each 30 and 40-ton for American Sheet & Tin Plate Co., Cambridge, O.; order to be placed this week.

One 15-ton crane for American Sheet & Tin Plate Co., Mercer works, Farrell, Pa.; bids being taken.

One 25-ton crane for Allegheny Steel Co., Brackenridge, Pa.; may buy used crane if in good condition.

Two 10-ton cranes for Blaw-Knox Co., Blawnox, Pa.; bids being taken; order may go to northern Ohio manufacturer to duplicate cranes now in use.

Cranes for Carnegie Steel Co. at Clairtown, Duquesne and Homestead, Pa.; and locomotive crane outfit for Mingo Junction, O.; bids being tabluated.

Cranes for Standard Sanitary Mfg. Co., Baltimore; orders expected to be placed within two weeks.

One 25-ton crane for Bessemer & Lake Erie railroad; papers not yet back from New York.

One 25-ton overhead crane for manufacturer in Harrisburg, Pa. district; bids being taken.

Two 10-ton cranes for subsidiary of United States Steel Corp., Pittsburgh district; bids being taken.

One 150-ton traveling crane, four 15-ton cranes and two 20-ton traveling cranes, for Finley yards, North Birmingham, Ala., of Southern railway, to be bought through Dwight P. Robinson & Co., Inc., New York, engineer.

New Construction and Enterprise

ANNISTON, ALA.—Anniston Foundry Co. will rebuild portion of plant recently damaged by fire.

ANNISTON, ALA.—Central Foundry Co., E. P. Cooper, manager, will replace $100,000 plant recently damaged by fire.

FAIRFIELD, ALA.—Tennessee Coal, Iron and Railroad Co. will increase its steel foundry capacity this spring, according to announcements by Gordon Crawford, president. Plans are that production will be extended to include castings for commercial purposes.

LOS ANGELES—Dutweiler Co., manufacturer of sheet iron, angle iron work, pumps and machinery, plans new plant on Leonard street.

OAKLAND, CAL.—The Marchant Calculating Machine Co., Powell and Landregan streets, plans 1-story foundry costing about $50,000 at Tenth avenue near High street.

BRIDGEPORT, CONN.—Special Machinery Co., Inc., has been incorporated with $50,000 capital.

DERBY, CONN.—Tryon Mfg. Co. has been incorporated for $25,000 to build, manufacture and deal in machinery and tools.

NEW HAVEN, CONN.—The Wheeler Mfg. Co. recently incorporated has leased space here for manufacture of steel cutlery.

SAVANNAH, GA.—Plans are being formulated by Central of Georgia to rebuild shops recently damaged by fire. New construction is to cost about $350,000. *Noted Nov. 29.*

CHICAGO—The Republic Flow Meter Co., 2240 Diversey Parkway, plans doubling present capacity of plant. Construction is to be started shortly.

CHICAGO—American Bolt Corp., through F. E. Davidson, 53 West Jackson boulevard, has taken bids for a plant, including machine, boiler, carpenter, cold, pump and storage shops, estimated to cost $500,000.

CHICAGO—Acorn Motor Truck Co., 3915 Armitage avenue, has been incorporated for $50,000 to manufacture and sell trucks, tops, parts, etc., by Adolph Dipping, Charles Statter, and L. G. Bartlett. Correspondent is Thomas Mathiesen, 431, 68 West Monroe street.

CHICAGO—The Stamograph Co., 549 Washington street, has been incorporated with 250 shares no par value stock to manufacture and deal in machines and merchandise, by Ruth Hoffman, Morris J. Hoffman and Philip D. Hoffman.

CHICAGO—Dayton Hydro Electric Power Co., 343 South Dearborn street, has been incorporated for $500,000 to construct, build and operate plants, transmission lines and apparatus, by E. J. Keeley, Fred D. Breit and M. K. Hobbs.

CHICAGO—Berryman Oil Burner Co., 109 East Chicago avenue, has been incorporated for $10,000 to manufacture and deal in heating and power system and equipment by John Christenson, H. M. Burnett and Walter C. Steffa.

CHICAGO—The Vergan Schmidt Co., 4513-15 South Halsted street, has been incorporated for $12,000 to design, manufacture and repair tools and machinery, by A. B. A. Schmidt, Charles Vergan, L. Vergan and E. O. Schmidt.

PEORIA, ILL.—The National Motorist Supply Co., 633 Main street, has been incorporated to manufacture and deal in steel, iron or metal products, by O. J. McCalla, Wendell C. Argraves and Hazel M. McCalla.

ROCKFORD, ILL.—The S. E. Rice Accessory Co., 225 South Main street, has been incorporated for $50,000 to manufacture and deal in metals and materials and products of iron, steel, etc., by Stuart E. Rice, Katherine B. Rice and George W. Curtis.

HAMMOND, IND.—The Paige & Jones Chemical Co., New York, recently completed an addition to its local plant and is installing new machinery to increase its boiler feed water treatment business.

INDIANAPOLIS, IND.—Stanworth Tool Mfg. Co. has been incorporated with $50,000 preferred stock.

WICHITA, KANS.—Hayes Equipment Co., 701 East Gilbert street, plans addition to its pump factory. It is planned to double present capacity of plant manufacturing oil and gasoline pumps and filling station equipment.

BATON ROUGE, LA.—The Buffum Tool Co. has been incorporated with 500 shares no par value stock to manufacture mechanic's tools.

SHREVEPORT, LA.—The Fulton Co., W. N. Fulton, president, plans 2-story, 60 x 144-foot reinforced steel and concrete building, costing approximately $50,000 to be built on Kingston pike. Company manufactures valves and temperature regulating devices.

BALTIMORE—Monarch Engineering & Mfg. Co., 1206 American building, has been incorporated by Harry D. Harvey, Ethel R. Gray and others to manufacture furnaces.

British Buying Many American Tools

ALTHOUGH British manufacturers export much machinery the United Kingdom is also a large importer and the United States furnishes by far the major portion of this business. As far back as 1910 the British Isles ranked third in importance as a market for American equipment, absorbing $4,500,000 that year. In 1913 it had taken second place with purchases of $10,400,000 worth.

During the world war importations from the United States were increased tremendously. After peace had been restored, Great Britain in 1922 continued to be second in importance as a market for American equipment, with purchases of $21,500,000. Some of this was re-exported. In 1913 re-exports were 35 per cent but in 1922 they were only 15 per cent.

Generally speaking, machinery imported from the United States is of the better class, machine tools and labor-saving equipment.

Sources of machinery imports by Great Britain are as follows in 1922:

Country	Percentage
United States	65.5
France	19.0
Germany	6.5
Sweden	4.0
All other countries	5.0

CUMBERLAND, MD.—Roman Steel Tennis Net Co. has been incorporated for $100,000 by J. Phillip Roman, William H. Oswald and others to manufacture products of wire and wire mesh.

BOSTON—The Lenk Mfg. Co. has been incorporated for $50,000 to manufacture electrical and automotive tools by Harry F. Brenner, Maxwell Edleman, and D. Allen Lenk.

BOSTON—The Stafford Co., 1715 Hyde Park avenue, manufacturer of mill equipment and machinery, plans 1-story, 40 x 80-foot machine shop costing about $25,000 including equipment.

SPRINGFIELD, MASS.—Domestic Appliance Mfg. Co. has been incorporated for $100,000 to deal in machinery of all kinds.

DETROIT—The Bee Hardware Co., care of I. Berkovitz, 1401 Gratiot avenue, plans 4-story, $50,000, 87 x 160-foot warehouse.

DETROIT—Zeldes Smelting & Refining Co. has been incorporated to carry on a general metal business with $10,000 capital, by May Zeldes, 4239 Brush street, Jacob Zeldes and Harry N. Ruby.

DETROIT—The Marks-Fiske-Zeiger Co. has been incorporated for $250,000 to deal in iron and steel supplies, by Harry J. Marks, 95 Puritan avenue, Louis Zeigler and Louis E. Fiske, Highland Park.

DETROIT—Consumer's Power Co., B. C. Cobb, president, will spend $15,000,000 in Michigan this year in power line extensions and new equipment. Plans call for 60,000 horsepower generating system on Saginaw river and 150 miles of steel tower high voltage transmission lines and other projects.

SAGINAW, MICH.—Norris Nover Iron Works was damaged recently by fire originating in heating system.

McCOMB, MISS.—An iron foundry and machine shop with several other buildings were damaged by fire Jan. 31.

ST. LOUIS—The Steelcote Mfg. Co., 700 North Main street, manufacturer of special paints and coatings, plans 4-story plant, 60 x 100 feet, at an estimated cost of $55,000, including equipment. Bids are to be called for in February. Hellmuth & Hellmuth, De Menil building, is architect. G. E. Niedt is president and treasurer.

OMAHA, NEBR.—Omaha Structural Steel Works, Forty-eighth and Leavenworth streets, was damaged Feb. 5 by fire with heavy loss. K. E. Vogel is general manager.

CARTERET, N. J.—Work has been started by Wheeler Condenser Engineering Co. on erection of a 100 x 245-foot foundry for the production of iron and brass castings.

BROOKLYN, N. Y.—Safety Spring Wheel Corp. has been incorporated with 5000 shares no par value common stock, by M. J. Sherlock, T. J. Bradbury and J. E. Closkey with W. F. X. Geoghan, 302 Broadway, as attorney.

BUFFALO, N. Y.—Michael Hayman & Co. has been incorporated for $1,200,000 to engage in metal smelting and refining, by Oscar M. and Edgar M. Hayman, 62 Colonial Circle, Buffalo.

NEW YORK—Novo Refrigerating Corp. has been incorporated for $100,000 to manufacture refrigerating and freezing machines, by Alex Ginsburg, 63 Park Row, New York.

NEW YORK—A. G. Richter has been incorporated for $25,000 to do structural iron work, by A. G. Richter, K. E. Richter and H. Hole,

with G. Lange Jr., 261 Broadway, as attorney.

NEW YORK—Ralco has been incorporated for $25,000 to manufacture hardware, by E. A. Rourse, R. Paris and W. Schaefer, with W. W. Gage, 250 West Fifty-fourth street, as attorney.

NEW YORK—Chaloner Automatic Overhead Stop Signal has been incorporated for $100,000 by T. T. Chaloner, R. Finch and G. L. Fisher, with S. Lewittes, 1328 Broadway, as attorney.

NEW YORK—Storms-Harvey Equipment Co. has been incorporated for $10,000 to make machinery, by E. A. Storms, J. B. Harvey and P. W. Eckert, with Griggs, Baldwin & Baldwin, 27 Pine street, as attorney.

NEW YORK—Rosander Auto-Rim Corp. has been incorporated for $1,000,000 to manufacture automobile wheels and other accessories, by R. Rosander, T. Weil and R. S. Voorhees, with N. Rosander, 334 Fulton street, as attorney.

NEW YORK—Francis H. Richards has been incorporated with 250 shares no par value common stock to operate machine and pattern shop, by F. H. Richards, F. J. Dole and J. F. Humphrey, with G. Drews, 15 Murray street, as attorney.

ROCKVILLE CENTER, L. I., N. Y.—Youngs MacEwan & Schier has been incorporated for $15,000 to make stoves, by F. T. Youngs, Jr., J. R. MacEwan and W. Schier.

SCHENECTADY, N. Y.—An automobile service and repair shop, costing $120,000 with equipment, will be erected by C. D. Christensen. Plans call for 1 and 2-story structure, 40 x 120 feet and 40 x 160 feet.

CHARLOTTE, N. C.—The Charlotte Supply Co., distributor of machinery, mill supplies, etc., has started constructing 4-story, $150,000 building. Considerable expansion is included in 1924 program.

Where additional information is presented, reference is made to date of issue in which previous item appeared.

CANTON, O.—The Gilliam Mfg. Co., 820 Savannah avenue, N. E., plans addition to its plant. Company manufactures taper roller bearings, castings, etc. B. T. Steiner is president.

CINCINNATI—The Aluminum Foundry Co. has been incorporated for $2500 by E. Albrecht, E. B. Albrecht, S. D. Kaefer, John Kaefer and H. L. Albers.

CLEVELAND—Statter Metal Co., 95 Hanna building, is constructing $40,000 foundry building at 7700 Bessemer avenue. A. Bloom, 10621 Garfield avenue, is contractor.

CLEVELAND—The Foster Bolt & Nut Co., 3556 East Seventy-second street, has awarded contracts for constructing 1-story, 36 x 228-foot, $50,000 factory.

CLEVELAND—The J. Roemer Heating Co., 1808 East Twenty-second street, plans constructing 1-story, 80 x 132-foot addition to factory costing about $40,000. W. S. Ferguson Co., 1900 Euclid avenue, is engineer.

CLEVELAND—The Bowler Foundry Co., 1688 Columbus road, plans constructing 1-story, 200 x 500-foot foundry on Newburgh street along tracks of South Shore railroad. J. H. Bruce is president and E. McGeorge, Stuyvesant building, is architect.

COLUMBUS, O.—Ohio State Stove & Mfg. Co., W. H. Parker, Buttles avenue, superintendent, plans two 1-story buildings, each to cost about $20,000. Truscon Steel Co. is engineer.

MANSFIELD, O.—The Ohio Brass Co. recently bought 5 acres of land and some building across the Pennsylvania railroad tracks from its present site.

PORTLAND, OREG.—Truscon Steel Co. has taken out permit to build $20,000 warehouse and steel fabricating plant.

ALLENTOWN, PA. — Bethlehem Motors Corp. will dispose of its branch plant at Pottstown, Pa., consolidating its production at its local plant. Increased facilities in equipment and floor space will be necessary.

AMBRIDGE, PA.—The National Metal Moulding Co. plans 1-story, 128 x 400-foot factory.

EASTON, PA.—Work will be started shortly by Sherwood & Sons Casket Co., Easton, Pa., on rebuilding its plant, which recently suffered $50,000 damage by fire.

KEPLERS, PA.—Binney-Smith Co. recently completed manufacturing plant, four stories, 80 x 100 feet, for which Lockwood, Greene & Co., New York and Boston, was engineer.

McDONALD, PA.—The General Foundry & Machine Co. has bought several acres of land along the Pennsylvania railroad from the Allegheny Forging Co., which with buildings and machinery involved a stated sum of more than $100,000.

NEW WILMINGTON, PA.—Quality Tool Corp. has been incorporated with $25,000 capital to manufacture tools of iron, steel and wood, by James A. McLaughry, William McLaughry and D. H. McQuiston, of New Wilmington, Ralph B. Miller, Youngstown, and Bruce McCrory, Pittsburgh.

PHILADELPHIA—Wm. Steele & Sons Co. is taking bids on a manufacturing building for G. A. Bisler Co., Fifth and Brown streets.

PHILADELPHIA—Joseph Kopperman &

(*Concluded on Page* 566)

New Trade Publications

MOLDING MACHINES—Johnston & Jennings Co., Cleveland, adorns 32 pages in a well-prepared booklet with halftones of its molding machines and views of installations, as well as descriptions of the several types and data relating to their adaptation to varied use in producing castings.

PICKLING—The Matthew Addy Co., Philadelphia, has issued a 32-page booklet to set forth the advantages of a compound to be added to the acid solution in the pickling process to prevent waste of acid and metal by modifying the acid to avoid some of the usual evils. Numerous useful reference tables are presented.

AIR COOLERS—The Griscom-Russell Co., 90 West street, New York, has issued a bulletin describing an air cooler for cooling the air from generator windings using turbine condensate. The cooling surface of this device is formed of tube elements, each being removable and having an outside diameter of ⅝ inch. It is claimed by using this cooler it is possible to use the air many times, thus keeping the air free and dry from dust.

AIR HEATERS—Partial recovery of heat ordinarily lost in flue gas is accomplished by a device described in a recent folder published by the Combustion Engineering Corp., Broad street, New York. The apparatus consists of a steel casing in which are contained a number of steel plates. By having the gas and air divided into alternate streams flowing in opposite directions, the gas furnishes heat to the plate which in turn is absorbed by the air. The folder is illustrated with sketches of the device.

STEEL PRODUCTS—The Emsco Steel Products Co., 7101-51 South Alameda street, Los Angeles, recently published a booklet describing steel products for the petroleum industry. Products listed are derricks, bull wheels, calf wheels, band wheels, sand reels, tug rims, crown blocks, casing blocks, tool joints, drill stems, forged steel flanges, blowout preventers, circulating heads, well pulling hoists, etc. The folder is illustrated.

STAINLESS STEEL—The Firth-Sterling Steel Co., McKeesport, Pa., has published a 62-page, cloth-bound volume giving the history, applications and types of stainless steel. The booklet also deals with the heat treatment and working necessary to its production, chemical analysis and resistance to various agencies of rust, stain and corrosion. It is embellished by various tables and graphs illustrating the subject.

SQUEEZERS—Air squeezers for foundry use are described in a folder recently published by the Adams Co., Dubuque, Iowa. The pistons of these machines are 12 inches in diameter and the working surfaces of the tables are 16 x 22 inches. This machine is built in stationary or portable types. Other foundry equipment such as flasks, presser boards, bottom boards, weights, sprue cutters, pneumatic rappers, and pattern vibrators, also are described.

INDICATING INSTRUMENTS—The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has issued a 24-page illustrated booklet entitled "Indicating Instruments for Direct and Alternating Currents." The first portion of the book deals with the development of alternating current and the earlier alternating current instruments, while the remainder of the booklet is devoted to a discussion of the instruments now manufactured. The last chapter is devoted to directions for applying indicating instruments.

CLAMSHELL BUCKETS—The Blaw-Knox Co., Blawnox, Pa., has published a 52-page booklet describing the types and sizes of its buckets. Among the buckets described is one having great closing power with few moving parts; a fast rehandling bucket; a bucket for handling heavy, lumpy material; a single-line bucket; a single-line foundry bucket; single-rope cableway, wheel bucket; etc. The publication is well illustrated. Other products of this company also are mentioned.

WIRE ROPE—Answers to many questions pertaining to wire rope may be found in an 80-page catalog recently issued by the Macwhyte Co., Kenosha, Wis. The construction of various kinds of rope is shown and the purpose to which it may be put also is indicated. Wire rope for haulage, hoisting, tiller, towing hawsers and mooring lines, guys, logging, etc., is described. Information also is included on hoist hooks, rope sockets, clips, turnbuckles, special fittings, etc., and directions for splicing are given.

Warehouse Steel Prices

Quotations at Cents Per Pound at Leading Market Centers

STEEL BARS	
Boston	3.515c
Buffalo	3.55c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Cleveland	3.36c
Detroit	3.35c
Los Angeles	4.00c
New York	3.54c
Philadelphia	3.47c
Pittsburgh	3.15c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.35c
St. Paul	3.45c
IRON BARS	
Boston	3.515c
Buffalo	3.50c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Detroit	3.35c
New York	3.54c
Philadelphia	3.47c
St. Louis	3.35c
SHAPES, STRUCTURAL	
Boston	3.615c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Los Angeles	4.10c
New York	3.64c
Philadelphia	3.57c
Pittsburgh	3.25c
San Francisco	3.60c
Seattle (large shapes)	3.75c
St. Louis	3.45c
St. Paul	3.55c
PLATES	
Boston	3.615c
Boston, 3/16-inch	3.04c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Detroit, 3/16-inch	3.45c
Los Angeles	4.00c
New York	3.64c
Philadelphia	3.57c
Philadelphia, 3/16-inch	3.82c
Pittsburgh	3.25c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.55c

NO. 10 BLUE ANNEALED SHEETS	
Boston, 3/16-inch	4.515c
Buffalo	4.30c
Chicago	4.00c
Cincinnati	4.10c
Cleveland	3.60c to 4.06c
Detroit	4.15c
Los Angeles	5.00c
New York	4.34c
Philadelphia	4.10c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.10c
St. Paul	4.25c
NO. 28 BLACK SHEETS	
Boston	5.00c
Buffalo	5.00c
Chicago	4.70c
Cincinnati	4.90c
Cleveland	4.50c to 4.65c
Detroit	4.85c
Los Angeles	6.20c
New York	4.50c to 4.70c
New York	4.85c
San Francisco	5.80c
Seattle	6.00c
St. Louis	4.75c
St. Paul	4.95c
NO. 28 GALVANIZED SHEETS	
Boston	6.00c
Buffalo	6.10c
Chicago	5.85c
Cincinnati	5.90c
Cleveland	5.60c to 5.80c
Detroit	6.00c
Los Angeles	7.00c
New York	5.85c
Philadelphia	6.25c
San Francisco	6.50c
Seattle	7.00c
St. Louis	5.75c
St. Paul	5.75c to 6.00c
BANDS	
Boston	4.315c
Buffalo	4.35c
Chicago	3.95c
Cincinnati	4.00 to 4.10c
Cleveland	4.01c to 4.16c
Detroit	4.10c
Los Angeles	4.90c
New York	4.39c
Philadelphia	4.27c
Pittsburgh	3.95c
San Francisco	4.50c
Seattle	4.75c
St. Paul	4.20c

HOOPS	
Boston	5.80c
Buffalo	4.65c
Chicago	4.55c
Cleveland	4.01c to 4.16c
Detroit	4.95c
New York	5.19c
Philadelphia, 1 inch and wider 20 gage and heavier	4.27c
Pittsburgh	3.95c
Seattle	5.50c
St. Paul	4.80c
COLD ROLLED STEEL	
Boston (rounds)	4.35c
Boston (shapes)	4.85c
Buffalo (rounds)	4.45c
Buffalo (shapes)	4.95c
Chicago (rounds)	4.00c
Chicago (shapes)	4.50c
Cincinnati (rounds)	4.25c
Cincinnati (shapes)	4.75c
Cleveland (rounds)	4.20c
Cleveland (shapes)	4.60c
Detroit (rounds)	4.30c
Detroit (shapes)	4.80c
Los Angeles (rounds)	5.60c
New York (rounds)	4.40c
New York (shapes)	4.90c
Philadelphia (rounds)	4.35c
Philadelphia (shapes)	4.85c
Pittsburgh (rounds)	4.05c
Pittsburgh (sq. hex. and flats)	4.55c
San Francisco (rounds)	5.50c
Seattle (rounds)	5.25c
St. Paul (rounds)	4.25c

WELDED PIPE

Discounts from warehouse, New York City

Standard Steel Pipe	Black	Galvanized
¼-⅜-inch butt	—31	+ 2
½-inch butt	—41	—24
¾-inch butt	—46	—32
1/3-inch butt	—48	—34
3½-6-inch lap	—44	—30
7-8-inch lap	—41	—11
9-10-inch lap	—35	— 8
11-12-inch lap	—34	— 6
Wrought Iron Pipe	**Black**	**Galvanized**
¼-⅜-inch butt	+44	+78
½-inch butt	— 4	+19
¾-inch butt	—11	+ 9
1-1½-inch butt	—14	+ 6
2-inch lap	— 5	+14
3-6-inch lap	—11	+ 6
7-12-inch lap	— 3	+16

Construction and Enterprise

(*Concluded from Page* 565)

Sons, 309 Florish street, Philadelphia, manufacturer of brass and bronze products, plans the erection of a plant building, costing $30,000.

PHILADELPHIA—General contract for erection of $30,000 plant for Corrugated Container Co. has been awarded to Robbins Contracting Co., 1137 North Front street.

PHILADELPHIA—Richard De Cou Co., iron and steel jobber, Eleventh and Hamilton streets, will start work at once on addition to its shop at Twelfth and Noble streets.

PHILADELPHIA—The Budd Wheel Co., Twenty-third street and Westmoreland, has awarded the general contract for a $4000 plant addition to Wark Co.

PHILADELPHIA—A $100,000 plant including a power house is to be erected by Wm. D. Whitaker, at the corner of M and Sedgley streets. Wm. Steele & Sons Co. has been awarded the general contract.

PHILADELPHIA—Columbia Steel Equipment Co., Third and Wingehocking streets, plans 1-story, 97 x 105-foot brick and concrete building. J. Frank Clark, 23 South Fifteenth street, is architect.

PHILADELPHIA—The foundry owned by the Pennsylvania railroad, at Lancaster avenue and Fiftieth street, has been purchased by the Keystone Roller Bearing Co., Inc., Fifty-third and Bromall streets, which will operate it in connection with its own plant.

WESTCHESTER, PA.—Westchester Steel Products Co., recently organized, has acquired the building of the Westchester Railway Co. at Lenape, which it will remodel for manufacture of manhole covers, flanges, etc.

WILKESBARRE, PA.—Plans are being prepared for erection of a 3-story branch factory, 90 x 120 feet, by Haines, Jones & Cadbury Co., 1136 Ridge street, Philadelphia, manufacturer of plumbing supplies. McCormick & French, Wilkesbarre, is architect.

WINDBER, PA.—The Hamill Wheel Mfg. Co. has been incorporated and expects to construct a plant in Ohio or Michigan for manufacture of automobile wheels.

ORANGEBURG, S. C.—The Orangeburg Machinery Co. is establishing new plant in this city. Company was incorporated recently by A. A. Lewis and associates.

WATERTOWN, S. DAK.—The Holt Motor Co., 226 East Kemp avenue, plans 1-story 57 x 100-foot $90,000 garage.

CHATTANOOGA, TENN.—Crane Enamelware Co. will double its capacity this spring through construction of additional facilities costing about $20,000.

ETOWAH, TENN.—The Louisville & Nashville railroad will construct $250,000 machine shop here.

KNOXVILLE, TENN.—The Fulton Co., W. M. Fulton, president, will buy additional equipment for $50,000, 2-story, 60 x 144-foot plant addition now under construction. Company manufactures temperature regulators and valves.

NASHVILLE, TENN.—The Tennessee Enamel Mfg. Co. has started reconstructing plant recently damaged by fire. New plant including about $40,000 worth of equipment, will cost approximately $100,000. M. H. Wright, 1710 Primrose avenue, is president of the company.

DALLAS, TEX.—Moline-George Co. has been incorporated for $400,000 to manufacture machinery and farm implements, by R. B. George, B. P. Clark and R. D. Inglefritz.

DALLAS, TEX.—Establishment of a factory for manufacturing steam automobile cleaning machines is planned by D. J. and R. M. Barnett, Federal street. Office has been opened at 212 South Akard street.

GREENVILLE, TEX.—Frank Reigger Machine Shop Co. has let contract for 54x90-foot building on Jordan street.

Bourne-Fuller Service

includes immediate shipment of all Iron and Steel materials from Cleveland and Cincinnati

Warehouses

If you are not receiving our Stock-list we shall be glad to send it to you regularly upon request.

Upson Works

Open Hearth Steel Bars for special uses. Also a complete line of Bolts and Nuts. Prompt Shipments.

THE BOURNE-FULLER CO.

Iron, Steel
Pig Iron
Coke

CLEVELAND

New York **Chicago**
San Francisco
Cincinnati **Detroit**

Iron and Steel Prices

Iron Ore

LAKE SUPERIOR ORES
Per Gross Ton Lower Lake Ports

Old range bessemer, 55 per cent iron.$6.45
Mesabi bessemer, 55 per cent iron.... 6.20
Old Range nonbessemer, 51½ per cent iron 5.70
Mesabi nonbessemer, 51½ per cent iron 5.55

EASTERN LOCAL ORES
Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 53 to 63 per cent ..... 10.00 to 11.00
Copper free low phosphorus 53 to 65 per cent ..... 13.25 to 16.50

FOREIGN IRON ORE
Cents per unit, c.i.f. Atlantic ports

Spanish low phosphorus, 52 to 54 per cent ..... 9.00 to 10.00
Algerian low phosphorus, 52 to 54 per cent ..... 10.00 to 10.50
Swedish and Norwegian low phosphorus, 68 per cent.... 11.00 to 12.00
Swedish foundry or basic, 66 to 68 per cent ..... 9.25 to 10.00
Spanish foundry or basic, 50 to 54 per cent 9.00

Manganese Ore

Prices do not include duty at rate 1 per cent per pound of metallic manganese contained.

Brazilian, minimum 47 per cent..... .....40 to 42 cents c.i.f. tidewater
Indian, minimum 47 per cent..... .....40 to 42 cents c.i.f. tidewater
Caucasian, 53 to 55 per cent..... .....42 to 45 cents c.i.f. tidewater

Fluor Spar

85 and 5 per cent grade

Washed gravel, Kentucky and Illinois mines, per net ton.$19.75 to 23.50
Washed gravel, imported, duty paid eastern tidewater, per gross ton ..... 20.60 to 21.10

Rivets

Structural rivets, C. L. Pitts..... 2.75c
Structural rivets, L.C.L. Pitts..... 2.90c
Rivets, 7/16-in. and smaller..... .....70 and 5 off to 65 and 10 off

Nuts and Bolts

(Up to 1¼ and 1⅜ inches inclusive)

Hot pressed square or hexagon blank .....$4.25 off list
Hot pressed square or hexagon tapped .....$4.25 off list
Cold punched square or hexagon blank .....$4.00 off list
Cold punched, square or hexagon... .....$4.00 off list
Cold punched semifinished hexagon nuts ⅝-inch and larger.....75 and 5 off
Cold punched semifinished hexagon nuts 9/16-inch and smaller.....80 and 5 off
Price f.o.b. Pittsburgh, packages of 50.

CARRIAGE BOLTS
(¾ x 6 inches, smaller and shorter)

Rolled thread .....60 and 5 off
Cut thread .....50, 10 and 5 off
Larger and longer.....50, 10 and 5 off

MACHINE BOLTS
(⅜ x 4 inches, hot pressed nuts)

Rolled thread .....60, 10 and 5 off
Cut thread .....60 and 5 off
Larger and longer .....60 and 5 off
(⅜ x 4 inches, cold punched nuts)
Cut thread .....50, 5 off
Larger and longer .....50, 5 off
Lag screws .....65 and 5 off
Plow bolts Nos. 1, 2 and 3 heads.... ..... 50 and 10 off
4 to 10 heads .....50-10 + 20 off
Flat and round head stove bolts..... ..... 75, 10 and 5 off
Other stove bolts .....75 and 5 off
Tap bolts .....25 and 10 off
Bolt ends with hot pressed nuts..... .....60 nd 5 off
Bolt ends with cold punched nuts.... .....50 and 5 off
Blank bolts .....60 and 10 off
Rough stud bolts with nuts..... .....45 and 5 off

Washers

Wrought washers .....$5.00 to $5.50 off

Steel Pipe

(Effective April 19, 1923)
Pittsburgh basing discounts, jobbers' carloads.

	Black	Galvanized
Butt Weld		
⅛-inch	45	19½
¼ and ⅜-inch	51	25½
½-inch	56	42½
¾-inch	60	48½
1 to 3-inch	62	50½
Lap Weld		
2-inch	55	43½
2½ to 6-inch	59	47½
7 to 8-inch	56	43½
9 and 10-inch	54	41½
11 and 12-inch	53	40½
REAMED AND DRIFTED		
Butt Weld		
1 to 3-inch	60	48½
Lap Weld		
2-inch	53	41½
2½ to 6-inch	57	45½
EXTRA STRONG—PLAIN ENDS		
Butt Weld		
⅛-inch	41	24½
¼ and ⅜-inch	47	30½
½-inch	53	42½
¾-inch	58	47½
1 to 1½-inch	60	49½
2 to 3-inch	61	50½
Lap Weld		
2-inch	53	42½
2½ to 4-inch	57	46½
4½ to 6-inch	56	45½
7 to 8-inch	52	39½
9 and 10-inch	45	32½
11 and 12-inch	44	31½
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	42	32½
¾ to 1½-inch	45	35½
2 to 2½-inch	47	37½
Lap Weld		
2-inch	41	32½
2½ to 4-inch	43	34½
4½ to 6-inch	42	33½
7 to 8-inch	38	25½

Wrought Iron Pipe

(Effective Jan. 23, 1923)
Pittsburgh basing discounts, jobbers, carloads

THREADS AND COUPLINGS

Butt Weld		
¼ and ⅜-inch	+11	+39
½-inch	22	2
¾-inch	28	11
1 to 1½-inch	30	13
Lap Weld		
1¼ and 1½-inch	Upon application	
2-inch	23	7
2½ to 6-inch	26	11
3 to 6-inch	28	13
7 to 12-inch	26	11

PLUGGED AND REAMED
Two points less than above

EXTRA STRONG, PLAIN ENDS

Butt Weld		
¼ and ⅜-inch	+19	+54
½-inch	21	7
¾-inch	28	12
1 to 1½-inch	30	14
Lap Weld		
2-inch	23	9
2½ to 4-inch	29	15
4½ to 6-inch	28	14
7 to 8-inch	21	7
9 to 12-inch	16	2
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+[illegible]
1¼-inch	+28	+40
1½-inch	+27	+39
Lap Weld		
2 and 2½-inch	+13	+[illegible]
3 to 4-inch	+ 8	+[illegible]
4½ to 6-inch	+ 9	+[illegible]
8-inch	+12	[illegible]

Boiler Tubes

L. C. L. discounts. C. L. 4 points larger

STEEL (Lap welded)
(Effective April 19, 1923)

2 and 2¼-inch ..... 23 off
2½ and 2¾-inch ..... 33 off
3-inch ..... 36 off
3¼ to 3¾-inch .....38½ off
4 to 13-inch ..... 42 off

CHARCOAL IRON
(Effective April 12, 1923)

1½-inch .....+22
1¾-inch .....+12
2 and 2¼-inch .....+ 2
2½ to 3-inch 3
3¼ to 4½-inch 5

SEAMLESS COLD DRAWN
(Effective April 19, 1923)

1-inch ..... 51 off
1¼ and 1½-inch ..... 43 off
1¾-inch ..... 27 off
2 and 2¼-inch ..... 18 off
2½ and 2¾-inch ..... 28 off
3 and 3¼-inch ..... 32 off
3½ and 3¾-inch ..... 33 off
4-inch ..... 37 off
4½and 5-inch ..... 29 off

SEAMLESS HOT ROLLED

3 and 3¼-inch ..... 34 off
3½ and 3¾-inch ..... 35 off
4-inch ..... 39 off

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per net ton for more than four gages heavier than standard and add 10 per cent to theoretical weight

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING
Base Discounts

Carbon, 0.10 to 0.20 per cent..... 83 off
Carbon, 0.30 to 0.40 per cent..... 81 off
Carbon, 0.40 to 0.50 per cent....net price
Plus differentials and extras for cutting.

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES
(Effective April 19, 1923)

Outside diameter	Gage	Net prices per foot f.o.b. Pittsburgh Price
2-inch	12-gage	15c
2-inch	12-gage	15c
2-inch	11-gage	16c
2-inch	10-gage	17c
2¼-inch	12-gage	17c
2¼-inch	11-gage	18c
2¼-inch	10-gage	20c
3-inch	7-gage	35c
1½-inch	9-gage	15c
5⅜-inch	9-gage	55c
5½-inch	9-gage	57c

Plus usual extras for forming and for long lengths.

Hot Rolled Alloy Steels

Prices per pound, Pittsburgh

S. A. E. Series—

2300 (3½ per cent nickel)..... 5.00 to 5.25c
3100 (nickel chromium)..... 4.00 to 4.25c
6100 (chrome vanadium)..... 5.00c
6100 (chrome vanadium spring) 4.75c
9250 (Silico manganese spring) 3.90c

SIVYER CASTINGS
DEPENDABLE

A steam shovel crawler track shoe. Cast in Sivyer Chrome Nickel Electric Alloy.

Send Blue Prints

The annealing process is exceptionally important in the making of castings similar to the one pictured above. It is only through a thorough and proper heat treatment that the alloy casting can attain the desired fine grain, interior integrity, and tensile strength.

In the Sivyer foundry the various castings are grouped according to the heat treatment required for each, and each lot is then given separate treatment. As a result, Sivyer alloy castings are always assured of a uniform and dependable toughness that defies hard knocks and hard service.

If you are having trouble with parts that have been in the past hammer forged, or cast in ordinary steel, send us your blue prints together with a statement of your difficulties. We will be glad to study the problems involved and recommend possible solutions, without obligation on your part.

Sivyer Alloy Steels can be tempered by heating and quenching.

Defeating casting breakage with Sivyer Electric Alloy

THE above shoe is used in the crawler track of a ¾-yard steam shovel. The castings previously used for this part proved unsatisfactory because they were either too soft or too brittle to withstand, without bending or breaking, the occasional blows of the heavy shovel dipper. The manufacturer turned to Sivyer for a stiffer, less brittle casting. As a result, Sivyer high carbon Chrome Nickel Electric Steel Castings have been adopted as standard. The manufacturer reports that not a single Sivyer shoe has broken in service. In the Sivyer foundry high carbon alloys receive the accurate furnace control and the specialized annealing that they require. The resulting castings are uniformly tough, non-brittle and withstand hard knocks without bending or breaking.

SIVYER STEEL

SIVYER STEEL CASTINGS COMPANY, MILWAUKEE

Iron and Steel Scrap Prices

CORRECTED TO TUESDAY NOON GROSS TONS DELIVERED TO CONSUMER

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	14.00 to 15.00
Boston (dealers)	14.00 to 14.50
Buffalo	20.50 to 21.00
Chicago	18.00 to 18.50
Cleveland	19.00 to 1925
Cincinnati	17.00 to 17.50
Detroit (dealers)	17.00 to 17.50
Eastern Pennsylvania	18.50 to 19.50
New York (dealers)	14.00 to 14.50
Pittsburgh	20.50 to 21.50
St. Louis	17.50 to 18.00
Valleys	21.00 to 21.50
No. 1 railroad steel New York (dealers)	14.75 to 15.25

COMPRESSED SHEETS

Buffalo	19.00 to 19.50
Chicago	16.00 to 16.50
Cleveland	17.25 to 17.50
Detroit (dealers)	15.00 to 15.50
Pittsburgh	20.00 to 20.50
Valley	19.25 to 19.50

BUNDLED SHEETS

Buffalo	14.50 to 15.00
Cincinnati	12.50 to 13.00
Cleveland	14.00 to 14.50
Detroit	12.00 to 12.50
Eastern Pennsylvania	16.00 to 16.50
Pittsburgh	18.50 to 19.00
St. Louis	11.00 to 11.50
Valley	17.25 to 17.50

SHEET CLIPPINGS, LOOSE

Chicago	12.00 to 12.50
Detroit	11.50 to 12.00

STEEL RAILS, SHORT

Birmingham	12.00 to 13.00
Boston (dealers)	14.00 to 14.50
Chicago	21.50 to 22.50
Cincinnati	20.50 to 21.00
Cleveland (over 6 pt.)	18.00 to 18.50
St. Louis	20.50 to 21.00

STOVE PLATE

Birmingham	16.50 to 17.50
Boston (consumers)	16.50 to 17.00
Buffalo	18.00 to 18.50
Pittsburgh	15.50 to 16.00
Chicago	19.50 to 20.00
Cincinnati (net iron)	13.00 to 13.50
Cleveland	18.25 to 18.50
Detroit (net ton) (dealers)	15.50 to 16.00
Eastern Pennsylvania	17.00 to 17.50
New York (dealers)	14.00 to 14.50
Pittsburgh	16.00 to 17.00
St. Louis	19.50 to 20.00

LOW PHOSPHORUS

Buffalo	24.00 to 25.00
Cincinnati	17.00 to 17.50
Eastern Pennsylvania	24.00 to 25.00
Pitts., billets and bloom crops	24.00 to 25.00

SHOVELING STEEL

Chicago	17.75 to 18.25
Pittsburgh	16.50 to 17.00
St. Louis	17.00 to 17.50

KNUCKLES, COUPLERS, SPRINGS

Chicago	22.00 to 22.50
Eastern Pennsylvania	23.00 to 23.50
Pittsburgh	23.00 to 23.50
St. Louis	22.00 to 22.50

FROGS, SWITCHES, GUARDS

Chicago	19.75 to 20.00
Eastern Pennsylvania	18.50 to 19.50
St. Louis	18.50 to 19.00

BOILER PLATE, CUT

St. Louis	12.25 to 12.75

ANGLE BARS—STEEL

Chicago	20.00 to 21.00
St. Louis	19.50 to 20.00

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	12.00 to 13.00
Boston dealers)	14.50 to 15.00
Buffalo	18.00 to 19.00
Cleveland, No. 1	17.00 to 17.25
Chicago, No. 1	17.50 to 18.00
Chicago, No. 2	18.00 to 18.50
Cincinnati No. 1	14.00 to 14.50
Detroit, No. 2	17.00 to 17.50
Eastern Pennsylvania	21.00 to 22.00
New York, No. 1 (dealers)	16.00 to 16.50
Pittsburgh, No. 1	17.50 to 18.00
Pittsburgh, No. 2	20.50 to 21.50
St. Louis, No. 1	17.50 to 18.00
St. Louis, No. 2	18.00 to 18.50

WROUGHT PIPE

Boston (dealers)	12.50 to 13.00
Buffalo	14.50 to 15.00
Eastern Pennsylvania	18.00 to 18.50
New York (dealers)	13.25 to 13.50

YARD WROUGHT

Boston	14.00 to 14.50
Eastern Pennsylvania	19.00 to 20.00

CITY WROUGHT

New York, long	15.50 to 16.00

BUSHELING

Buffalo	18.50 to 19.00
Chicago, No. 1	16.25 to 17.00
Chicago, No. 2	11.75 to 12.25
Cincinnati, No. 1	13.00 to 13.50
Cleveland No. 1	14.50 to 15.00
Cleveland, No. 2	13.00 to 13.25
Detroit, No. 2	13.00 to 13.50
Detroit, No. 2 (new)	13.00 to 13.50
Detroit, No. 2 (old)	10.00 to 10.50
Eastern Pennsylvania	16.00 to 17.00
Pittsburgh, No. 1	18.00 to 18.50
St. Louis, No. 1	17.00 to 17.50

MACHINE SHOP TURNINGS

Birmingham	8.00 to 9.00
Boston (dealers)	11.00 to 11.50
Buffalo	14.00 to 14.50
Chicago	11.00 to 11.50
Cincinnati	11.00 to 11.50
Cleveland	15.00 to 15.25
Detroit (dealers)	11.75 to 12.25
Eastern Pennsylvania	16.00 to 16.50
New York (dealers)	12.25 to 12.75
Pittsburgh	16.00 to 16.50
St. Louis	10.50 to 11.00
Valleys	14.75 to 15.00

CAST IRON BORINGS

Birmingham (chemical)	15.00 to 16.00
Birmingham (plain)	9.00 to 10.00
Boston (chemical)	12.50 to 13.00
Boston (dealers)	12.00 to 12.50
Buffalo	14.50 to 15.00
Chicago	15.50 to 16.00
Cincinnati	12.50 to 13.00
Cleveland	15.25 to 15.50
Detroit (dealers)	12.00 to 12.50
Eastern Pennsylvania (chem.)	18.00 to 18.50
Eastern Pennsylvania	16.00 to 16.50
New York (dealers' price)	12.00 to 12.25
Pittsburgh	16.50 to 17.00
St. Louis	14.00 to 14.50
Valleys	15.75 to 16.00

MIXED BORINGS AND TURNINGS
For blast furnace use

Boston (dealers)	11.00 to 11.50
Cleveland	15.25 to 15.50
Detroit (dealers)	12.00 to 12.50
Eastern Pennsylvania	15.00 to 16.00
New York (dealers)	11.75 to 12.25

IRON AXLES

Birmingham	21.00 to 22.00
Boston (consumers)	31.00 to 32.00
Buffalo	30.00
Chicago	33.50 to 34.00
Cincinnati	23.50 to 24.00
Eastern Pennsylvania	28.00 to 30.00
New York (dealers)	25.75 to 26.25
St. Louis	30.50 to 31.00

IRON RAILS

Buffalo	21.00 to 22.00
Chicago	21.00 to 21.50
Cincinnati	16.00 to 16.50
St. Louis	17.50 to 18.00

PIPES AND FLUES

Chicago	14.25 to 14.75
Cincinnati	11.00 to 11.50
Cleveland	14.50 to 14.75
St. Louis	13.75 to 14.25

RAILROAD GRATE BARS

Buffalo	17.50 to 18.00
Chicago	18.75 to 19.25
Cleveland	18.00 to 18.25
Eastern Pennsylvania	17.00 to 18.00
New York (dealers)	14.25 to 14.75
St. Louis	19.50 to 20.00

FORGE FLASHINGS

Boston (dealers)	11.00 to 11.50
Chicago, small	13.50 to 14.00
Cleveland, (under 10 in.)	14.25 to 14.50
Cleveland, (over 10 in.)	13.75 to 14.00
Detroit (dealers)	12.50 to 13.00

FORGE SCRAP

Boston (dealers)	11.00 to 11.50
Chicago	21.00 to 22.00
Eastern Pennsylvania	16.00 to 17.00

ARCH BARS AND TRANSOMS

Chicago	23.50 to 24.00
St. Louis	24.00 to 24.50

ANGLE BARS—IRON

Chicago	23.00 to 23.50
St. Louis	24.00 to 24.50

Iron and Steel Works Scrap

AXLE TURNINGS

Boston (dealers)	11.00 to 11.50
Buffalo	16.00 to 16.50
Chicago	16.50 to 17.00
Cleveland	16.25 to 16.50
Eastern Pennsylvania	16.00 to 16.50
Pittsburgh	19.00 to 19.50
St. Louis	14.00 to 14.50

STEEL CAR AXLES

Birmingham	19.00 to 20.00
Boston (consumers)	20.00 to 21.00
Buffalo	21.00 to 22.00
Chicago	23.00 to 23.50
Cleveland	22.00 to 23.00
Eastern Pennsylvania	23.00 to 25.00
New York (dealers)	19.00 to 19.50
Pittsburgh	23.00 to 24.00
St. Louis	23.00 to 23.50

SHAFTING

Boston (consumers)	21.00 to 22.00
Chicago	24.50 to 25.00
Eastern Pennsylvania	23.00 to 25.00
New York (dealers)	18.25 to 19.25
St. Louis	23.00 to 23.50

Iron Foundry Scrap

CAR WHEELS

Birmingham, tram car	17.00 to 18.00
Birmingham, iron	16.00 to 17.00
Boston (consumers)6	20.00 to 20.50
Buffalo	20.50 to 21.00
Chicago, iron	21.50 to 22.00
Cincinnati	15.00 to 15.50
Eastern Pennsylvania	18.50 to 19.50
New York iron (dealers)	15.75 to 16.25
Pittsburgh, iron	21.00 to 21.50
Pittsburgh, steel	23.00 to 23.50
St. Louis, iron	21.50 to 22.00

NO. 1 CAST SCRAP

Birmingham, cupola	20.00 to 20.50
Boston (consumers)	22.50 to 23.00
Buffalo	20.00 to 20.50
Chicago, cupola	22.50 to 23.00
Cincinnati No. 1 machinery cupola (net tons)	20.50 to 21.00
Cleveland, cupola	21.50 to 22.00
Detroit (net tons) (dealers)	18.50 to 19.00
Eastern Pennsylvania, cupola	19.50 to 20.50
New York, cupola (dealers)	17.75 to 18.25
Pittsburgh, cupola	21.00 to 21.50
San Francisco	25.00 to 26.00
St. Louis, railroad	21.50 to 22.00
St. Louis, agricultural	21.00 to 21.50
Valleys	21.00 to 22.00

HEAVY CAST

Boston (consumers)	19.00 to 19.50
Buffalo (breakable)	17.00 to 17.50
Cleveland	16.50 to 17.00
Detroit (automobile) (net ton)	22.50 to 23.00
Eastern Pennsylvania	17.50 to 18.50
New York (dealers)	17.00 to 17.50
Pittsburgh	20.00 to 20.50

MALLEABLE

Boston (railroad)	19.00 to 20.00
Buffalo	22.00 to 23.00
Chicago, railroad	22.00 to 22.50
Chicago, agricultural	20.50 to 21.50
Cincinnati, agricultural	17.00 to 17.50
Cincinnati, railroad	16.50 to 17.00
Cleveland, agricultural	20.50 to 21.00
Cleveland, railroad	21.50 to 21.75
Detroit (dealers)	18.00 to 18.50
Eastern Pennsylvania, railroad	17.00 to 18.00
Pittsburgh, railroad	19.50 to 20.00
St. Louis, agricultural	18.50 to 19.00
St. Louis, railroad	19.50 to 20.00

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	17.00 to 17.50
Boston (dealers)	16.00 to 16.25
Chicago	20.00 to 20.50
Cleveland	20.00 to 20.50
Detroit	17.50 to 18.00
Eastern Pennsylvania	21.00 to 22.00
New York (dealers)	18.50 to 19.00
Pittsburgh district	23.50 to 24.00
St. Louis	19.50 to 20.00

LOCOMOTIVE TIRES

Chicago	20.00 to 21.00
St. Louis	18.50 to 19.00

LOW PHOSPHORUS PUNCHINGS

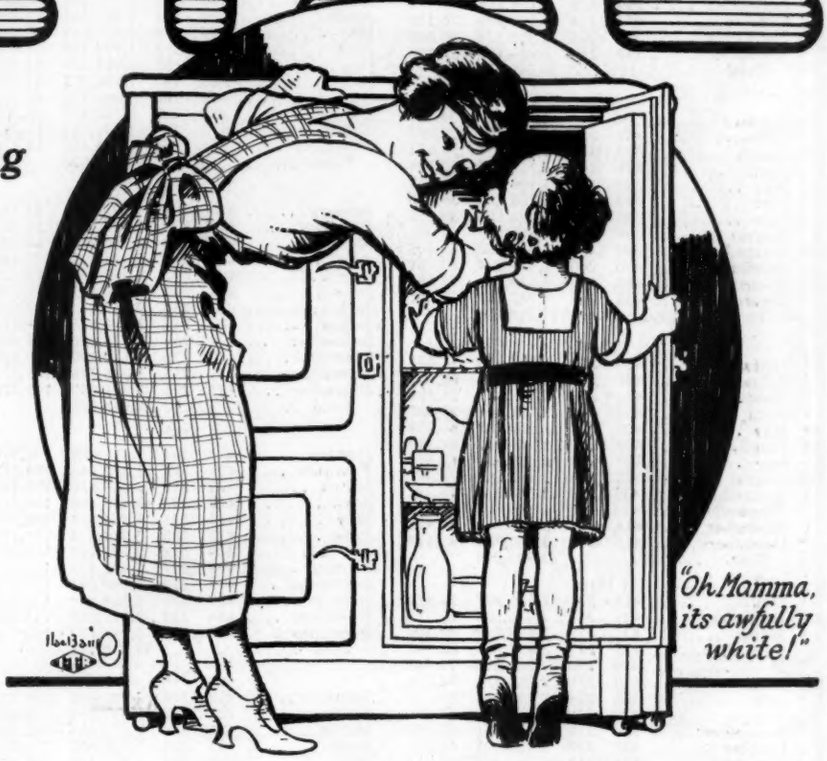
Chicago	19.50 to 20.00
Eastern Pennsylvania	23.00 to 24.00
Pittsburgh	23.00 to 24.00

WABIK METAL

—the Base for Distinctive Enameling

of

REFRIGERATORS
STOVE DOORS
PANELS
SPLASHER BACKS
TABLE TOPS
BROILER PANS
SIGNS
and other flat work



WABIK Metal is a Special Material Specially Treated for Vitreous Enameling. It comes in the form of sheets rolled from our own special "BOTTOM POURED" INGOTS. By using WABIK METAL you will create a bigger demand for your enameled products.

Other Mansfield Specialties:

AUTOMOBILE SHEETS—Body Stock; Flat Fender and Hood Stock; Cowl Stock; Radiator Casing Stock; Crown Fender Stock.

METAL FURNITURE, MILK CAN STOCK, PICKLED AND ANNEALED ENAMELING STOCK for Kitchen Utensils.

ELECTRICAL SHEETS.

SHEET BARS

INGOTS

Our improved methods in our plants plus the continuous application of the results of continuous study of the steel user's needs, are your guarantee of unusually good service both from our products and ourselves. ***May we prove the merits of Mansfield products with a trial order?***

The Mansfield Sheet & Tin Plate Co.

Mansfield, Ohio

DISTRICT SALES REPRESENTATIVES

The L. D. Rockwell Co., 1106 National City Bldg., New York, N. Y.
Mansfield Sheet & Tin Plate Co., Wrigley Bldg., Chicago, Ill.
Mansfield Sheet & Tin Plate Co., 12-237 General Motors Bldg., Detroit, Mich.
The L. D. Rockwell Co., 1512 B. F. Keith Bldg., Cleveland, O.
Walter G. Clark, Inc., 106 N. Third St., St. Louis, Mo.
Walter G. Clark, Inc., 313 American Bank Bldg., Kansas City, Mo.
Mr. C. H. Beach, 617 Merchants Bank Bldg., Indianapolis, Ind.
Mr. A. P. Grenier, 640 Endicott Bldg., St. Paul, Minn.
Mr. Herbert P. Hill, 401 Continental Trust Bldg., Washington, D. C.
Wm. P. Horn Co., 237 Rialto Bldg., San Francisco, Cal.
Wm. P. Horn Co., 301 Kerchoff Bldg., Los Angeles, Cal.
Wm. P. Horn Co., Dekum Building, Portland, Ore.
Wm. P. Horn Co., 1426 L. C. Smith Bldg., Seattle, Wash.

Iron and Steel Production

Compiled By IRON TRADE REVIEW

Pig Iron

	-Stacks- No.	In	Output— Total	Av. daily
1907				
January	376	311	2,174,801	70,155
February	374	308	2,047,036	73,109
March	377	304	2,186,709	70,539
April	378	327	2,226,708	74,223
May	391	329	2,291,030	73,904
June	392	341	2,237,420	74,580
July	396	335	2,253,243	72,685
August	397	329	2,243,656	72,376
September	399	329	2,174,148	72,471
October	401	314	2,359,690	76,119
November	398	226	1,820,558	60,685
December	398	154	1,234,733	39,830
Total			25,249,732	
1908				
January	398	139	1,081,813	34,897
February	401	150	1,086,809	37,476
March	398	154	1,229,856	39,672
April	398	146	1,155,122	38,504
May	396	145	1,168,002	37,677
June	395	154	1,106,300	36,876
July	397	166	1,228,604	39,632
August	399	181	1,366,019	44,065
September	399	189	1,416,252	47,208
October	400	200	1,573,824	50,764
November	402	212	1,582,314	52,744
December	403	221	1,723,664	55,602
Total			15,718,579	
1909				
January	406	234	1,787,473	57,683
February	407	233	1,682,470	60,088
March	406	229	1,822,024	58,793
April	406	224	1,731,406	57,687
May	407	236	1,866,757	60,218
June	408	240	1,929,929	64,334
July	409	258	2,088,620	67,375
August	412	278	2,232,642	72,021
September	413	297	2,378,655	79,201
October	413	309	2,589,681	83,538
November	414	311	2,532,740	84,425
December	416	314	2,682,702	86,539
Total			25,325,099	
1910				
January	416	311	2,599,995	83,871
February	417	311	2,429,525	86,768
March	417	310	2,588,736	83,508
April	418	291	2,477,700	82,590
May	419	279	2,374,802	76,607
June	420	271	2,288,279	76,276
July	420	254	2,158,124	69,617
August	422	244	2,103,791	67,864
September	420	234	2,048,461	68,282
October	421	230	2,086,205	67,297
November	421	218	1,910,385	63,679
December	421	193	1,779,899	57,416
Total			26,845,902	
1911				
January	421	210	1,766,658	56,985
February	421	226	1,781,285	63,617
March	421	236	2,165,764	69,863
April	421	220	2,044,904	68,163
May	421	206	1,871,888	60,367
June	421	202	1,773,282	59,109
July	423	196	1,776,108	57,294
August	423	206	1,921,832	61,995
September	423	216	1,973,918	65,797
October	421	214	2,092,061	67,486
November	421	214	1,999,100	66,637
December	422	215	2,032,301	65,558
Total			23,198,601	
1912				
January	421	227	2,052,806	66,220
February	422	235	2,098,796	72,372
March	420	237	2,411,529	77,791
April	421	239	2,377,621	79,254
May	423	243	2,503,341	80,753
June	424	242	2,433,737	81,125
July	422	245	2,402,567	77,502
August	423	255	2,500,163	80,650
September	419	262	2,444,454	81,482
October	422	280	2,683,645	86,569
November	423	289	2,639,562	87,985
December	423	291	2,777,292	89,590
Total			29,325,513	
1913				
January	423	297	2,787,800	89,929
February	423	306	2,578,670	92,095
March	423	278	2,762,823	89,123
April	421	297	2,754,353	91,812
May	421	285	2,816,825	90,865
June	422	283	2,616,883	87,229
July	422	264	2,558,275	82,525
August	424	260	2,537,018	81,839
September	425	258	2,494,098	83,137
October	425	244	2,539,924	81,933
November	424	225	2,229,960	74,322
December	424	191	1,976,138	63,746
Total			30,652,767	
1914				
January	423	199	1,879,336	60,624
February	423	219	1,888,607	67,450
March	423	232	2,341,551	75,534
April	422	212	2,261,501	75,383
May	422	198	2,097,019	67,646
June	422	193	1,904,566	63,486
July	422	187	1,955,324	63,075
August	422	187	1,996,483	64,403
September	422	180	1,882,718	62,757
October	422	162	1,767,227	57,007
November	421	150	1,501,269	50,042
December	421	154	1,495,325	48,236
Total			22,970,926	
1915				
January	421	165	1,591,024	51,323
February	421	179	1,666,592	59,521
March	421	190	2,046,280	66,009
April	421	197	2,114,518	70,484
May	421	207	2,255,157	72,747
June	421	221	2,369,932	78,998
July	421	234	2,563,311	82,687
August	421	246	2,774,825	89,510
September	420	266	2,834,342	94,478
October	420	276	3,120,340	100,656
November	421	285	3,035,235	101,174
December	421	295	3,201,605	103,278
Total			29,573,161	
1916				
January	421	304	3,171,878	102,319
February	421	312	3,078,548	106,157
March	422	315	3,327,630	107,343
April	422	320	3,225,496	107,517
May	423	321	3,364,584	108,535
June	423	325	3,213,818	107,127
July	419	316	3,221,127	103,907
August	419	317	3,197,838	103,156
September	419	326	3,208,041	106,935
October	419	328	3,508,180	113,167
November	420	322	3,317,805	110,593
December	422	309	3,184,178	102,715
Total			39,019,123	
1917				
January	422	310	3,159,839	101,930
February	422	317	2,649,935	94,641
March	423	331	3,255,813	105,026
April	425	333	3,328,061	110,936
May	425	340	3,413,677	110,119
June	427	347	3,260,234	108,675
July	429	351	3,337,442	107,659
August	431	357	3,238,970	104,483
September	431	342	3,140,742	104,691
October	433	354	3,296,286	106,332
November	434	344	3,198,597	106,620
December	435	321	2,885,380	93,077
Total			38,164,976	
1918				
January	435	294	2,403,227	77,523
February	435	319	2,318,242	82,723
March	438	338	3,209,996	103,548
April	437	351	3,273,355	109,112
May	437	360	3,451,884	111,351
June	437	353	3,316,148	110,538
July	437	364	3,408,584	109,954
August	439	371	3,378,479	108,983
September	438	364	3,413,223	113,774
October	437	364	3,482,392	112,335
November	437	360	3,347,844	111,595
December	435	351	3,434,114	110,778
Total			38,437,488	
1919				
January	435	330	3,306,279	106,654
February	435	311	2,943,347	105,120
March	435	279	3,088,023	99,614
April	435	216	2,474,374	82,479
May	433	197	2,107,729	67,991
June	433	199	2,114,028	70,467
July	434	240	2,424,212	78,200
August	432	266	2,742,081	88,453
September	433	163	2,480,790	82,692
October	432	216	1,864,424	60,142
November	432	252	2,407,369	80,244
December	432	262	2,626,074	84,711
Total			30,578,730	
1920				
January	432	285	3,012,373	97,172
February	432	305	2,984,257	102,904
March	433	315	3,375,768	108,895
April	433	278	2,752,670	91,754
May	433	297	2,991,825	96,510
June	433	302	3,046,623	101,553
July	434	291	3,043,918	98,190
August	434	306	3,145,536	101,468
September	434	317	3,124,308	104,143
October	435	290	3,288,341	106,075
November	435	255	2,935,081	97,836
December	435	202	2,700,268	87,105
Total			36,400,968	
1921				
January	436	184	2,414,753	77,895
February	436	155	1,929,394	68,906
March	436	103	1,594,866	51,447
April	436	96	1,190,751	39,691
May	436	90	1,215,272	39,202
June	436	74	1,064,007	35,466
July	435	69	864,642	27,892
August	436	69	954,901	30,802
September	435	84	985,795	32,859
October	435	95	1,234,450	39,821
November	429	120	1,414,958	47,165
December	429	123	1,642,775	52,992
Total			16,506,564	
1922				
January	430	127	1,645,804	53,090
February	429	139	1,630,180	58,220
March	429	155	2,035,908	65,674
April	429	161	2,070,161	69,005
May	427	175	2,309,348	74,495
June	427	191	2,362,455	78,748
July	427	170	2,403,030	77,517
August	427	143	1,810,665	58,408
September	427	189	2,024,008	67,466
October	428	218	2,629,655	84,827
November	428	241	2,846,110	94,870
December	428	253	3,083,520	99,468
Total			26,850,844	
1923				
January	428	261	3,228,226	104,136
February	424	278	2,993,918	106,925
March	424	295	3,523,595	113,664
April	423	311	3,547,012	118,233
May	423	322	3,868,486	124,790
June	424	322	3,667,868	122,262
July	418	299	3,684,677	118,860
August	418	270	3,448,886	111,254
September	418	254	3,117,526	103,917
October	418	245	3,142,642	101,375
November	418	229	2,891,191	96,373
December	418	231	2,912,527	93,952
Total			40,025,850	
1924				
January	414	248	3,017,444	97,337

Ingots and Castings

By American Iron and Steel Institute

	Ingots	Castings	Total
1918	43,051,022	1,411,410	44,462,432
1919	33,694,795	976,437	34,671,232
1920	40,881,392	1,251,542	42,132,934
1921	19,184,084	559,713	19,743,797
1922	34,568,418	1,034,508	35,602,926

Monthly Ingot Output

Gross Tons

1923	95.35 per cent of capacity	Calculated total
January	3,644,629	3,822,369
February	3,294,264	3,454,918
March	3,858,675	4,046,854
April	3,760,997	3,944,412
May	4,000,695	4,195,800
June	3,574,567	3,748,890
July	3,350,829	3,514,241
August	3,506,755	3,677,771
September	3,161,964	3,316,166
October	3,382,986	3,547,966
November	2,969,012	3,113,804
December	2,711,529	2,843,764
Total	41,216,902	43,226,955
1924		
	95.35 per cent	
January	3,432,541	3,599,938